



D R A F T   E N V I R O N M E N T A L   I M P A C T   R E P O R T

# PIERCE'S DISEASE CONTROL PROGRAM

California Department of Food and Agriculture

March 2002  
SCH# 2001032084



# **DRAFT ENVIRONMENTAL IMPACT REPORT**

for the

## **PIERCE'S DISEASE CONTROL PROGRAM**

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California Department of Food and Agriculture

**SCH# 2001032084**

LEAD AGENCY:

California Department of Food and Agriculture  
State of California  
1220 N Street  
Sacramento, CA 95814  
Contact: Mr. Jim Rains  
(916) 651-9371

IN CONSULTATION WITH:

Real Estate Services Division  
Department of General Services  
State of California  
P.O. Box 989052  
West Sacramento, CA 95798-9052  
Contact: Ms. Susan Stratton  
(916) 376-1610

PREPARED BY:

EDAW, Inc.  
753 Davis Street                      2022 J Street  
San Francisco, CA 94111              Sacramento, CA 95814

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## **I.0 INTRODUCTION**

This Draft Environmental Impact Report (EIR) has been prepared to provide an environmental assessment of the proposed Pierce's Disease Control Program (PDCP). The proposed PDCP would be a statewide program to minimize the impact of Pierce's disease in California. A major strategy in this program is to reduce the spread and occurrence of the glassy-winged sharpshooter, a non-native insect capable of spreading the disease to new areas of California. The California Department of Food and Agriculture (CDFA) is the agency responsible for coordinating this statewide comprehensive program, and is the Lead Agency for this EIR. The county agricultural commissioner, or other agency designated by the Board of Supervisors of each county, would have the responsibility for local implementation of the program, with coordination by CDFA. The program has five central elements: public outreach, statewide survey, contain the spread, local management and rapid response, and research.

The proposed program to be evaluated in this EIR is an extension of an ongoing emergency program and regulations mandated by the California State Legislature to control Pierce's disease and the glassy-winged sharpshooter. Because the emergency regulations and response program were created in response to an emergency, they are exempt from the California Environmental Quality Act (CEQA) (State CEQA Guidelines, California Code of Regulations [CCR] Title 14, Chapter 3, Section 15269). The proposed PDCP evaluated in this EIR, if approved, would be a continuation of the emergency program as a long-term program, with attendant regulations. A brief history of the emergency program is provided below and a detailed description of the proposed PDCP is provided in Chapter 4.

### **I.1 LEGISLATIVE AND REGULATORY ACTIONS RELATED TO THE EMERGENCY PROGRAM**

Pierce's disease is a bacterial infection that kills grapevines. It has existed in California for over 100 years. The introduction of the glassy-winged sharpshooter (a non-native insect in the leafhopper family) into California in the late 1980s has resulted in an increase in the incidence and severity of Pierce's disease in California, particularly southern California (Appendix B). The glassy-winged sharpshooter is prolific, disperses rapidly, and carries the bacteria from vine to vine, resulting in a substantial increase in Pierce's disease in vineyards.

A significant loss of grapevines from Pierce's disease transmitted by this insect has occurred in the Temecula Valley (Riverside County). It has been estimated by the Temecula Valley Winegrowers Association that 840 acres of vineyard were lost due to Pierce's disease during 1998 through 2000, which represents 30% of the total vineyard acreage in Temecula (TVWA, 2001). In California, grape production is a \$3.4 billion industry and the wine grape industry alone contributes \$33.7 billion to the California economy (CDFA, 2001b). In addition to grapes (955,000 acres), other crops such as almonds (595,000 acres), citrus (273,000 acres), peaches (67,800 acres), nectarines (33,000 acres), pears (19,300 acres), alfalfa (1,010,000 acres), and ornamentals are vulnerable to various strains of the bacteria (CDFA, 2001b and USDA, 2001).

The magnitude of the threat facing California from Pierce's disease and the glassy-winged sharpshooter first came to light in Riverside County. In August 1999, because of damage being suffered in Temecula, the County of Riverside declared a local emergency. In response, CDFa quickly developed an action plan and appointed an ad-hoc group, the Glassy-winged Sharpshooter/Pierce's Disease Advisory Task Force, to determine research priorities and help develop long-term strategies to combat the emerging threat. In October 1999, the University of California Pierce's Disease Research and Emergency Response Task Force was formed to mobilize UC expertise towards helping growers combat Pierce's disease of grapevines. In November 1999, the Pierce's Disease Advisory Task Force and some of its subcommittees were established to review research proposals, make funding recommendations, and develop management and control plans. On May 16, 2000, the State Legislature passed emergency Pierce's disease control provisions (Senate Bill 671, Statutes of 2000) that outline specific requirements for county agencies, and authorized the Secretary of CDFa to adopt program regulations. In this legislation, codified in Sections 6045-6047 of the Food and Agricultural Code, the Legislature found and declared that Pierce's disease and its vectors present a clear and present danger to the state's grape industry, other agricultural commodities, and plant life.

On July 7, 2000 a federal declaration of emergency was published in the Federal Register. This was in response to a request from Governor Gray Davis that the United States Department of Agriculture (USDA) declare a state of emergency under federal law. The effective date of the declaration was June 23, 2000 (65 Federal Register 41930, July 7, 2000).

On July 25, 2000, CDFa, pursuant to legislative mandates, adopted emergency regulations for movement of nursery stock and bulk grapes (CCR, Title 3, Sections 3650-3660). On November 8,

2000, CDFA adopted emergency regulations for bulk citrus movement. Both sets of emergency regulations have been re-adopted one or more times. The emergency regulations may be re-adopted as long as the emergency remains. The regulations implement a statewide response program to arrest the spread of the glassy-winged sharpshooter.

## **I.2 FOCUS OF THIS EIR**

As Lead Agency, CDFA has prepared this Draft EIR to determine if there are potential adverse environmental impacts that could occur as a result of the implementation of the proposed PDCP. This EIR has been prepared in accordance with, and in fulfillment of, the California Environmental Quality Act (CEQA) (Public Resources Code Sections 21000-21177), and the State CEQA Guidelines (CCR Title 14, Sections 15000-15387). CDFA is the Lead Agency for the Program and for the CEQA review. The Real Estate Services Division of the California Department of General Services is assisting CDFA in the performance of CEQA review of the proposed PDCP.

This is a programmatic EIR for the statewide effort to control Pierce's disease and the glassy-winged sharpshooter. This EIR is designed to inform CDFA, county agricultural commissioners, responsible agencies, and the public of any potential significant environmental impacts of the proposed program. In addition, as mandated by state law, the document provides information on any significant impacts that cannot be avoided; growth-inducing impacts; effects found not to be significant; and significant cumulative impacts of past, present, and reasonably foreseeable future projects or actions. CDFA, as Lead Agency, has authority over whether to approve the proposed PDCP and thus continue the statewide efforts to control Pierce's disease and the glassy-winged sharpshooter. The EIR is intended to cover implementation of the proposed PDCP by state and local jurisdictions.

The focus of this Draft EIR was established by CDFA after considering comments from government agencies and the public regarding the proposed program. CDFA circulated a Notice of Preparation (NOP) on March 16, 2001. The NOP was circulated a second time on May 17, 2001 to ensure all County Clerks in California received a copy of the notice. In addition, four community scoping sessions on the program were held in April 2001 in Napa, San Luis Obispo, Riverside, and Visalia to inform the public of the proposed project, solicit comments, and identify areas of concern. Transcripts of the public scoping sessions and written comments are available from CDFA upon request. All of the comments gathered during the scoping period were considered in

the development of this EIR. Comments that raised significant environmental impact issues are addressed in the EIR.

After considering the issues raised in the scoping period, and the potential for adverse environmental effects of the proposed program, this EIR focuses on the following topics:

- Agriculture and Land Use
- Hazards
- Water Quality
- Biological Resources

### **1.3 EFFECTS NOT GIVEN IN-DEPTH EVALUATION IN THIS EIR**

Based upon CDFA's analysis and through the scoping efforts described above, it was determined that the PDCP would not have the potential to create significant effects in several environmental resource areas, so these topics are not considered further in this environmental analysis. Consistent with the requirements of State CEQA Guidelines Section 15128, the following sections describe why it was determined that significant environmental effects are not anticipated to occur in the resource areas of aesthetics, air quality, cultural resources, geology and soils, hydrology, mineral resources, noise, public services, traffic, utilities, and service systems.

#### **1.3.1 AESTHETICS**

In general, implementation of most components of the PDCP would not require the construction of visible facilities. Only two proposed activities could result in a change to the visual environment: construction of screens around a few nurseries for research purposes and possible construction of greenhouses or other facilities for a biological control program.

Shipment of nursery stock is a means for glassy-winged sharpshooters to move to uninfested areas. CDFA initiated a pilot program in fall 2001 to research the effectiveness of constructing screens around nurseries to protect nursery stock from infestation by the glassy-winged sharpshooter. It is likely that this research would continue under the proposed PDCP. CDFA would share the results of the program with nursery owners and growers, who, if it is proven effective, may choose to use screens as a control method. The screens could be between 15 and 25 feet high and would be made of a mesh material similar to shade cloth. This research program would involve at most only a few

nurseries. The trial nurseries would be chosen such that the screens would not result in significant impacts to visual resources.

If new greenhouse or other facilities were required for the biological control program, they would most likely be developed on lands that are currently being used for agricultural purposes or a similar compatible use. Because these facilities would be modest in size, and would be similar to other facilities in the surrounding area (e.g., greenhouses would be constructed in areas where other greenhouses are located), these facilities are not anticipated to be discernible from the surrounding land uses, and would not create a substantial change in visual character. Further, additional environmental review of these facilities would occur when they are proposed for development, as required by Sections 15162 and 15168(c) of the State CEQA Guidelines.

### **I.3.2 AIR QUALITY**

In general, the proposed PDCP would not result in activities that would generate dust or other construction-generated air emissions. An exception could be the construction of new greenhouse or laboratory facilities. These facilities would be limited in size and the duration of construction would be relatively short. For these reasons, significant construction-related emissions would not occur.

Automobile-related emissions would not increase with implementation of the PDCP. Although a few automobile trips may be required to transport workers, materials, and equipment required to implement the PDCP (e.g., required for the posting of notifications, inspection of nursery stock and other crops, or meeting with residents or neighborhoods), these trips would not cause substantial increase in air pollution in the air basins where they would occur. These trips would result in fewer than 2,000 vehicle trips per day<sup>1</sup> statewide, which is minor when considering generation of vehicle emissions across the state.

Chapter 5.2 of this Draft EIR addresses the potential effects of hazardous air emissions related to the use of pesticides in the PDCP.

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<sup>1</sup> 2,000 vehicle trips per day is the threshold used by the Bay Area Air Quality Management District in recommending a detailed air quality analysis be conducted for a project.

### **I.3.3 CULTURAL RESOURCES**

In general, the program would not result in ground disturbance or the disturbance of the physical environment in ways that may disturb archeological or historic resources. As an exception, the construction of new greenhouses or laboratories for a biological control program could result in minor ground disturbance. Most likely, existing facilities would be used. Because the exact location of these facilities is not known, it is not possible to provide a site-specific evaluation. However, given that greenhouse and laboratory facilities would likely be constructed in areas that have already been disturbed, no significant impacts to cultural resources are anticipated. Additional environmental review of these facilities would occur when they are proposed for development, as required by Sections 15162 and 15168(c) of the State CEQA Guidelines.

In the event that human remains are encountered as a result of any activity related to the PDCP, the applicable county coroner would be contacted and appropriate measures implemented. These actions would be consistent with State Health and Safety Code Section 7050.5, which prohibits unauthorized disinterring, disturbing, or removing human remains from any location.

### **I.3.4 GEOLOGY AND SOILS**

The proposed PDCP would not result in ground disturbance or the disturbance of the physical environment in ways that would result in significant geologic or soil impacts. The only activities that could result in physical development would be the construction of new greenhouse or laboratory facilities for the biological control element of the proposed program. Because these facilities would be constructed in areas that are generally flat and free of substantial geologic hazards (e.g., landslides or ground failure), no significant impacts are anticipated. Further, all new facilities would be required to comply with the applicable requirements of the Uniform Building Code or the California Building Code. Thus, no significant geologic or soil impacts are anticipated.

### **I.3.5 HYDROLOGY (EXCLUDING WATER QUALITY)**

The proposed PDCP would not result in a discernible increase in the use of water. In addition, because the proposed program would not result in substantial development of new facilities (i.e., there would not be a substantial increase in impervious surfaces), it would not result in additional storm drainage flows, or substantially alter drainage patterns. Although significant hydrological impacts are not anticipated, additional environmental review of greenhouse and laboratory facilities

for the biological control element of the proposed PDCP would occur if these facilities were proposed for construction, as required by Sections 15162 and 15168(c) of the State CEQA Guidelines.

Chapter 5.3 addresses the potential water quality impacts of the proposed PDCP.

### **I.3.6 MINERAL RESOURCES**

The program would not substantially alter subsurface resources, nor result in substantial ground-disturbance. Thus, it would not result in the loss of availability of a known mineral resource.

### **I.3.7 NOISE**

The activities that are suggested by the proposed PDCP (i.e., research, notification activities, application of pesticides, biological control release, etc.) would not result in an increase in ambient noise levels. These activities are not substantial noise generators. To meet program requirements, growers may treat commercial cropland areas by aerial application if this is an allowable practice for the area. However, because this is a common practice for agricultural areas, an increase in ambient noise levels would not occur.

### **I.3.8 PUBLIC SERVICES**

Because the program would not result in new development or substantial demand for new public services, new service facilities would not be needed. Thus, no environmental impacts would occur as a result of the construction of new facilities.

### **I.3.9 TRAFFIC**

Although a few automobile trips may be required to transport workers, materials, and equipment required to implement the PDCP (e.g., required for the posting of notifications, inspection of nursery stock and other crops, or meeting with residents or growers), these trips would not cause traffic congestion. These additional trips would not be substantial in relation to existing traffic volumes.

### **I.3.10 UTILITIES AND SERVICE SYSTEMS**

Because the program would not result in new development creating an additional population or substantial demand for new utilities and service systems, new service facilities would not need to be constructed. Thus, no environmental impacts would occur as a result of the construction of new facilities.

## **I.4 REPORT ORGANIZATION**

This Draft EIR is organized into the following chapters:

**Chapter 1: Introduction** provides an introduction to the PDCP and an overview describing the focus of this EIR and the environmental review process.

**Chapter 2: Summary** summarizes the potential environmental effects that could result from implementation of the proposed PDCP. This chapter also identifies areas of controversy and issues to be resolved.

**Chapter 3: Environmental Setting** describes the existing environmental setting for the program.

**Chapter 4: Program Description** describes the components of the proposed PDCP, the agencies that are expected to use the EIR in their decision-making, and permits and other approvals required to implement the program.

**Chapter 5: Environmental Analysis** provides an analysis of the potential environmental impacts of the PDCP. Chapter 5 is divided into 4 sub-chapters: Agriculture and Land Use, Hazards, Water Quality, and Biological Resources.

**Chapter 6: Other Environmental Issues** includes other analyses required by CEQA, including Irreversible Environmental Changes and Growth Inducing Impacts.

**Chapter 7: Cumulative Impacts** provides a summary of the proposed PDCP's incremental effect when added to other related past, present, or reasonably foreseeable future projects.

**Chapter 8: Alternatives** considers a range of reasonable alternatives to the proposed program and the comparative environmental implications of the alternatives. This chapter includes an analysis of the No Project Alternative, as required by CEQA.

**Chapter 9: Non-Environmental Issues Raised by the Public** addresses issues raised by the public that are not considered environmental issues within the purview of CEQA, and thus not evaluated in Chapter 5.

**Chapter 10: Glossary** provides definitions of unfamiliar terms used in the EIR.

**Chapter 11: List of Abbreviations Used in the EIR** identifies the full name or phrase represented by abbreviations used in the EIR.

**Chapter 12: References** identifies the organizations and persons consulted and references used for this Draft EIR.

**Chapter 13: Preparers of this Report** identifies the preparers of this Draft EIR.

## **I.5 ENVIRONMENTAL REVIEW PROCESS**

Consistent with the requirements of CEQA, a good faith effort has been made during the preparation of this EIR to contact and consult with affected agencies, organizations, and persons who may have an interest in this program. This included the circulation of a Notice of Preparation (NOP) on March 16, 2001, which began a 30-day comment period. The purpose of the NOP was to inform agencies and the general public that an EIR was being prepared for the PDCP, and to invite specific comments on the scope and content of the EIR. Four scoping meetings were held in April 2001 in Napa, San Luis Obispo, Riverside and Visalia. The NOP was re-issued on May 17, 2001 to ensure all County Clerks in California received a copy of the notice.

CDFR has filed a Notice of Completion (NOC) with the Governor's Office of Planning and Research, State Clearinghouse indicating that this Draft EIR has been completed and is available for review and comment by the public. A Notice of Availability of the Draft EIR has been published concurrently with distribution of this document. A 45-day review period (from the date of the Notice of Availability) is provided for the public and other agencies to review and comment

on the Draft EIR. Public hearings on the Draft EIR will be held during the public review period. The dates, times, and locations of the public hearings will be posted on CDFA's glassy-winged sharpshooter/Pierce's disease information web page at: <http://www.cdfa.ca.gov/phpps/pdcp/> and notices will be printed in major newspapers.

Reviewers of this Draft EIR should focus on the sufficiency of the document in identifying and analyzing the potential environmental impacts of the PDCP. Comments may be made on the Draft EIR before the end of the comment period, either in writing or orally during the public hearings. Following the close of the public review period, CDFA will prepare responses to comments on the content and conclusions of the Draft EIR and revise the Draft document as necessary to address those comments. The Draft EIR and technical appendices, revised if necessary, together with the responses to the comments, will constitute the Final EIR.

Written comments on the Draft EIR should be sent to:

Ms. Susan Stratton, Ph.D.  
Real Estate Services Division  
Department of General Services  
State of California  
P.O. Box 989052  
West Sacramento, CA 95798-9052  
phone (916) 376-1610  
fax (916) 376-1606

CDFA will review the Final EIR for adequacy and consider it for certification pursuant to the requirements of Section 15090 of the State CEQA Guidelines. If CDFA certifies the Final EIR and decides to approve the program, a Notice of Determination (NOD) will be prepared and filed with the State Clearinghouse. The NOD will include a description of the project, the date of approval, and the address where the Final EIR and record of program approval are available for review.

If the Pierce's Disease Control Program EIR is certified and the program is approved, county PDCP workplans would be examined in light of the program EIR to determine if these plans are

consistent with the EIR. CDFA must approve county workplans prior to allocating state funding for the local program. County PDCP workplans would be examined in light of the program EIR to determine whether an additional environmental document must be prepared (State CEQA Guidelines 15168 (c)). If the county finds that pursuant to CEQA Guidelines Section 15162, no new significant effects would occur, no previously identified significant effects are substantially more severe, or no new mitigation measures would be required that would reduce significant effects, the county can adopt the workplan as being within the scope of the program covered by the program EIR and no new environmental document would be required. If variations in a county's workplan or changes in circumstances would result in any of these consequences, the county requesting the variations would be required to prepare appropriate environmental documentation prior to receiving state funding. In addition, supplemental environmental review would be required if substantial changes occur with respect to the circumstances under which the program is undertaken, if these changes could result in new significant environmental effects, as required by Section 15162 (a)(2) of the State CEQA Guidelines.

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## **2.0 SUMMARY**

This section presents a summary of the environmental review and analysis of the proposed Pierce's Disease Control Program (PDCP), as described in Chapter 5 of this Draft Environmental Impact Report (EIR). A summary of the potential environmental impacts identified in the body of this report is found at the end of this section. The Summary is organized by the topical sections of the report. Detailed discussions are found within each of the applicable sections contained in Chapter 5.

### **2.1 PROGRAM UNDER REVIEW**

This EIR has been prepared to assess the potential environmental effects of the proposed PDCP, which is a coordinated statewide program to minimize the statewide impact of Pierce's disease and the glassy-winged sharpshooter, a non-native insect capable of spreading Pierce's disease to new areas of California.

Pierce's disease is caused by a strain of the bacterium *Xylella fastidiosa* that kills grapevines by clogging their water-conducting vessels (xylem). Several strains of this bacterium exist, attacking and causing damage to different host plants including grapes, citrus, stone fruits, almonds, alfalfa, oleander, and certain shade trees (including oaks, elms, maples and sycamore). There is no known cure for the disease. The glassy-winged sharpshooter is an aggressive non-native insect that feeds on the xylem fluid of over 700 plant species and has the ability to spread the bacterium that causes Pierce's disease. Because the glassy-winged sharpshooter is prolific, disperses rapidly, and transmits the bacteria from grapevine-to-grapevine, it has the ability to substantially increase the incidence of Pierce's disease in California. The proposed program intends to contain the spread of the glassy-winged sharpshooter and the disease until researchers can find a solution to Pierce's disease.

On May 16, 2000, the State Legislature passed emergency provisions for addressing Pierce's disease and the glassy-winged sharpshooter (Senate Bill 671, Statutes of 2000, Sections 6045-6047 of the Food and Agricultural Code). These provisions outline specific requirements for county agency Pierce's disease workplans, and authorize the Secretary of CDFA to adopt program regulations to control Pierce's disease and the glassy-winged sharpshooter. The proposed program evaluated in this EIR would continue the activities of the current emergency program and regulations. CDFA is the agency responsible for developing a statewide comprehensive control

program and is the Lead Agency for this EIR. The agricultural commissioner, or other agency designated by the Board of Supervisors of each county, would have the responsibility for local implementation of the program, with coordination by CDFA.

The program has five central elements: public outreach, statewide survey, contain the spread, local management and rapid response, and research. Please see Chapter 4 for a detailed description of the proposed program.

## **2.2 AREAS OF CONTROVERSY/ISSUES TO BE RESOLVED**

CDFA issued a Notice of Preparation (NOP) for this EIR on March 16, 2001. Four community scoping sessions on the program were held in April 2001 in the cities of Napa, San Luis Obispo, Riverside, and Visalia to inform the public of the proposed project, solicit comments, and identify areas of concern. Transcripts from these meetings and comment letters received during the scoping period are available from CDFA upon request. The NOP was re-issued on May 17, 2001 to ensure all County Clerks in California received a copy of the notice. Key issues that were raised during the scoping process are listed below.

- The public raised concerns about whether the effects of Pierce's disease and the glassy-winged sharpshooter were severe enough to warrant a statewide control program.
- General concerns were raised by the public about the use of pesticides, including the effects of pesticides on human health. Specifically, commentors were concerned that pesticides could have negative effects on specific populations of concern, such as children, the elderly, and people with illnesses. In addition, commentors were concerned about the effects of pesticides on biological resources and water quality. Concern about the effects of pesticides on organic farms, integrated pest management programs, commercial bee colonies, and other land uses were also noted.
- It was questioned whether the use of pesticides in non-agricultural areas was necessary for effective control of the glassy-winged sharpshooter.
- Concerns were raised about the effects of the release of non-native natural enemies (such as predatory/parasitic insects) on biological resources.
- The public raised concerns that non-pesticide alternative methods for controlling Pierce's disease and the glassy-winged sharpshooter were not evaluated for use in the program.

All of the comments gathered during the scoping period were considered in the development of this EIR, to the extent that they raised environmental concerns and to the extent that they related to the proposed PDCP, and were addressed as appropriate.

### **2.3 UNAVOIDABLE SIGNIFICANT IMPACTS**

State CEQA Guidelines Section 15126(b) requires an EIR to “describe any significant impacts, including those that can be mitigated but not reduced to a level of insignificance.” Chapter 5 of this EIR provides a description of the potential environmental impacts of the proposed PDCP. All potential environmental impacts of the proposed PDCP would be less than significant.

### **2.4 ALTERNATIVES TO THE PROGRAM**

CEQA requires the Lead Agency to consider a range of reasonable alternatives to the proposed program that meet the program's basic objectives, while avoiding or reducing significant impacts. The following alternatives are considered in Chapter 8 of this EIR:

- The No Project Alternative;
- Alternative A: Regulate the movement of commodities that may carry the glassy-winged sharpshooter but do not take any action against glassy-winged sharpshooter infestations;
- Alternative B: Regulate the movement of commodities that may carry the glassy-winged sharpshooter and abate new glassy-winged sharpshooter infestations on agricultural lands, using the most effective treatments available; and
- Alternative C: Regulate the movement of commodities that may carry the glassy-winged sharpshooter and abate all infestations of glassy-winged sharpshooter outside of the generally infested areas, but do not use conventional pesticides in non-agricultural areas.

The alternatives evaluate different combinations of program elements and control methods. Chapter 8 also evaluates alternative control methods for their effectiveness in containing the spread of Pierce's disease and the glassy-winged sharpshooter, which is a basic program objective. In addition, Chapter 8 describes two alternatives that were considered but withdrawn from further analysis, because it was determined that they were either infeasible or would not avoid or lessen the potential environmental impacts of the proposed PDCP.

## 2.5 SUMMARY OF IMPACTS

According to the State CEQA Guidelines, a significant effect on the environment means “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance” (Section 15382).

The potential for PDCP activities to result in adverse environmental impacts is described in Chapter 5 of this EIR. With the implementation of the additional safeguards provided within the PDCP, all of the potential environmental impacts would be less than significant. For this reason, no additional mitigation measures are recommended in this EIR. Table 2-1 provides a summary of potential environmental impacts evaluated in this EIR and the safeguards in the PDCP that mitigate impacts to a less-than-significant level. Potential impacts are numbered in accordance with the environmental topic to which they pertain and in the order they appear within each EIR section.

**TABLE 2-1: SUMMARY**

Impact	Mitigation Measures / Safeguards	Significance
<b>Land Use</b>		
<p><u>Impact LU-1:</u> In general, the PDCP would not result in physical alterations to the landscape. Although the PDCP may require additional greenhouses or other facilities, development of these types of facilities would be limited in size and located in existing research or agricultural areas. Thus, no physical division of a community would occur. Consequently, there would be no significant effect.</p>	<p><u>Mitigation Measure LU-1:</u> No mitigation is required for this less-than-significant impact (LTS). Additional environmental review of new facilities would occur when they are proposed for development, as required by Sections 15162 and 15168(c) of the State CEQA Guidelines.</p>	LTS
<p><u>Impact LU-2:</u> The PDCP includes restrictions on the movement of goods and vehicles. These restrictions could cause an inconvenience to producers, shippers, and receivers. Although the agricultural community could experience economic effects from shipment delays, these delays would benefit the overall economic health of the agricultural community by controlling Pierce's disease. Further, the inconveniences and economic effects related to the restrictions included in the PDCP would not result in physical changes to the environment, so no environmental impact would occur.</p>	<p><u>Mitigation Measure LU-2:</u> No mitigation is required for this less-than-significant impact.</p>	LTS
<p><u>Impact LU-3:</u> Under the rapid response component of the PDCP, non-agricultural areas could be treated with pesticides by ground crews. Residents and other site occupants would be notified prior to application of pesticides, and would be advised to avoid treated areas until re-entry conditions are met (typically approximately two hours). Providing ground crew access and avoiding treated areas could temporarily disrupt use of the treatment sites, which would cause an inconvenience to residents and occupants. However, this temporary inconvenience would not result in a significant effect to the physical environment, as defined by CEQA. (For a discussion of the potential for hazards related to pesticide use, please refer to Chapter 5.2.)</p>	<p><u>Mitigation Measure LU-3:</u> No mitigation is required for this less-than-significant impact.</p>	LTS

Impact	Mitigation Measures / Safeguards	Significance
<p><u>Impact LU-4:</u> The proposed PDCP could result in temporary loss of some wild and hobby-kept bees. County agricultural commissioners would notify registered beekeepers within the treatment boundaries about program activities and hobbyist beekeepers would be notified of program activities through the general community notification process. Although measures are available to beekeepers to protect their bees, some loss could occur. However, loss of individual bees does not necessarily result in the loss of the bee colony. Such losses would not decrease bee populations below self-sustaining levels, because pesticide applications are limited to infestation areas and untreated areas would be accessible to the colony. Thus, impacts to bee colonies resulting from the PDCP are considered less than significant. For further discussion, refer to chapter 5.4.</p>	<p><u>Mitigation Measure LU-4:</u> No mitigation is required for this less-than-significant impact. Additional program safeguards to minimize the effect to bees include notification of registered beekeepers about program activities in their area prior to treatment. With this notification, beekeepers could take whatever action they deem prudent to protect their beehives. In addition, pesticide label instructions often prohibit application of the pesticide or allowing it to drift to blooming plants and weeds if bees are visiting the treatment area.</p>	LTS
<p><u>Impact LU-5:</u> The PDCP could result in a loss of some beneficial insect species that are a part of pest management programs. Such a loss could result in a disruption of normal agricultural operations. As a result, pest management programs may need to be adjusted where pesticide control of the glassy-winged sharpshooter is required. This disruption could result in an inconvenience and economic effects to growers; however, no significant environmental impacts are anticipated from the operational shift. (For a discussion of the potential for hazards related to pesticide use, please refer to Chapter 5.2.)</p>	<p><u>Mitigation Measure LU-5:</u> No mitigation is required for this less-than-significant impact.</p>	LTS
<p><u>Impact LU-6:</u> The PDCP may require the construction of additional greenhouses or other facilities. Where possible, existing facilities would be used. However, new facilities could be developed if existing facilities are not available. These facilities are anticipated to be located within existing agricultural areas or research facility sites. Thus, no significant environmental impacts are anticipated with the development of potential new greenhouses and laboratory facilities.</p>	<p><u>Mitigation Measure LU-6:</u> No mitigation is required for this less-than-significant impact. Additional environmental review of new facilities would occur when they are proposed for development, as required by Sections 15162 and 15168(c) of the State CEQA Guidelines.</p>	LTS

Impact	Mitigation Measures / Safeguards	Significance
<p><u>Impact LU-7:</u> PDCP-related applications of pesticides could lead to temporary withdrawal of organic certifications for growers. Although this effect could be economically adverse to growers who wish to market organic products, it is not considered an impact to the physical environment under CEQA. Organic farms could be temporarily converted to non-organic farms; however, this conversion would not result in a conversion of agricultural lands to non-agricultural use. This impact is less than significant according to CEQA.</p>	<p><u>Mitigation Measure LU-7:</u> No mitigation is required for this less-than-significant impact.</p>	LTS
<p><u>Impact LU-8:</u> The PDCP would not directly affect the potential conversion of agricultural lands to non-agricultural use. Rather, the PDCP would benefit the agricultural industry by supporting the economic viability of the state's grape industry and perhaps other commodity groups. As a result, the program could prevent the indirect conversion of farmland to non-agricultural use. No significant environmental effect is associated with this issue.</p>	<p><u>Mitigation Measure LU-8:</u> No mitigation is required.</p>	LTS
<b>Hazards</b>		
<p><u>Impact Haz-1:</u> As a result of pesticide application for the PDCP, people in non-agricultural areas could potentially come into contact with residues through skin contact, inhalation, or through ingestion of treated materials. The U.S. EPA and California Department of Pesticide Regulation (CDPR) consider the potential exposure of people to residues of a pesticide when evaluating it for registration, and to determine any restrictions necessary to ensure that it can be used safely. Any pesticide employed in the PDCP is required to be registered and applied only in a manner consistent with its restrictions. The potential for spray drift from pesticides applied by ground personnel is monitored and limited by professional applicators. Pesticide application is also monitored by county agricultural commissioners and CDPR. The registration program, use restrictions, and monitoring would ensure that pesticides are applied with a reasonable certainty of no harm to human health or the environment. Therefore, this is a less-than-significant impact.</p>	<p><u>Mitigation Measure Haz-1:</u> No mitigation is required for this less-than-significant impact. Additional program safeguards to minimize potential hazards include professional application of registered pesticides and monitoring of pesticide applications by CDPR to verify proper application rates and provide information about pesticide residues in the surrounding environment. The data from environmental monitoring would be reviewed to ensure that applications do not lead to undesirable residue levels. Anomalous results would be evaluated to determine if application methods needed to be adjusted, and if so, the PDCP would require that treatments be modified accordingly.</p>	LTS

Impact	Mitigation Measures / Safeguards	Significance
<p><u>Impact Haz-2:</u> As a result of the PDCP, some growers and nursery owners may be required to treat their crops with pesticides to control the glassy-winged sharpshooter. Growers may choose to use aerial application over commercial cropland areas where allowed. Agricultural and nursery workers have a potential for exposure to pesticides. The U.S. EPA and CDPR consider the potential exposure of people to residues when a pesticide is proposed for registration, and to determine any application restrictions necessary to ensure that it can be used safely. Pesticide use restrictions are imposed to ensure that agricultural and nursery workers are not exposed to pesticide residues before it is safe. Because of use restrictions and monitoring, pesticide application in agricultural areas would occur with a reasonable certainty of no harm to human health. Therefore, this is a less-than-significant impact.</p>	<p><u>Mitigation Measure Haz-2:</u> No mitigation is required for this less-than-significant impact. Additional program safeguards to minimize potential hazards include professional application of registered pesticides. California law requires that pilots receive training and have a pest control aircraft pilot's certificate from CDPR. In addition, specific worker health and safety regulations require notification of pesticide applications and training for field workers.</p>	LTS
<p><u>Impact Haz-3:</u> Fragile populations, i.e., individuals who are susceptible to health complications, because of health or developmental status (e.g., acutely ill, very young or old, or pregnant individuals), may be present in certain locations, such as parks, recreation areas, sports arenas, hospitals, nursing homes, adult care centers, day care centers, and schools. When evaluating a proposed pesticide, CDPR adds an additional uncertainty factor to compensate for inherent uncertainties in the process. The uncertainty factor takes into account the variability in susceptibility within populations. In addition, the PDCP includes measures to ensure that schools, day care centers, and similar places would be given special consideration in scheduling pesticide treatments, which would further limit the potential for pesticide exposure. With these measures, the potential for health hazards to fragile populations would be less than significant.</p>	<p><u>Mitigation Measure Haz-3:</u> No mitigation is required for this less-than-significant impact. Additional program safeguards to reduce potential health impacts to fragile populations include notification of schools, day care centers, rest homes, and hospitals that are nearby any proposed treatment operations prior to treatment. Special scheduling would be arranged, if necessary. Pesticide treatments on school grounds and busy public areas would be scheduled for off-time hours when feasible. CDPR would conduct monitoring to verify proper application rates. The data from environmental monitoring would be reviewed to ensure that applications do not lead to undesirable residue levels. Anomalous results would be evaluated to determine if application methods needed to be adjusted, and if so, the PDCP would require that treatments be modified accordingly.</p>	LTS

Impact	Mitigation Measures / Safeguards	Significance
<p><u>Impact Haz-4:</u> Pesticide applicators and agricultural workers have the greatest potential for exposure to pesticides. PDCP pesticide applications would be made by licensed pesticide applicators. All licensed applicators are certified through the Licensing and Certification Program administered by CDPR. Pesticide applicators receive annual training that includes routine and emergency decontamination procedures, safety procedures and requirements for handling pesticide materials, and emergency first aid measures. Pesticide use restrictions are in place to ensure that agricultural field workers are not exposed to pesticide residues before it is safe. Compliance with these restrictions by the PDCP would avoid significant hazards to the health and safety of workers.</p>	<p><u>Mitigation Measure Haz-4:</u> No mitigation is required for this less-than-significant impact. California worker health and safety regulations specify safe work practices for employees who handle pesticides or work in treated areas. The regulations require certification and training for pesticide applicators, notification of pesticide applications, and training for field workers. CDPR and county agricultural commissioners enforce worker safety regulations.</p>	LTS
<p><u>Impact Haz-5:</u> Because the effects of pesticides are related to dose, potential impacts to human health could occur with accidental spills and improper use and disposal of pesticides. Licensed pesticide applicators receive training on routine and emergency decontamination procedures, safety requirements for handling pesticides, and emergency first aid. While it is possible that an accident could occur with implementation of the PDCP, the program would not result in an increase in accident risk. PDCP safeguards and annual training of licensed pesticide applicators would ensure that these risks would be less than significant.</p>	<p><u>Mitigation Measure Haz-5:</u> No mitigation is required for this less-than-significant impact. Pesticide labels provide instructions for proper handling, storage, and disposal of pesticides. Licensed pesticide applicators receive training on routine and emergency decontamination procedures, safety requirements for handling pesticides, and emergency first aid procedures. Moreover, local jurisdictions maintain emergency action and preparedness plans in case of an accidental spill.</p>	LTS

Impact	Mitigation Measures / Safeguards	Significance
<b>Water Quality</b>		
<p><u>Impact WQ-1:</u> The active ingredients of the pesticides to be used for the control of the glassy-winged sharpshooter can reach surface water after rainfall or as a result of spray drift. Applying pesticides consistent with label requirements would reduce potential water quality impacts. Pesticide application requirements vary; however, they do not allow direct application to water if there are potentially significant water quality impacts associated with surface water applications. In addition, pesticide labels also require precautions be taken against contaminating water as a result of equipment use and cleaning. When a pesticide is evaluated for registration, the U.S. EPA and CDPR consider how it breaks down in water environments. Application restrictions are developed based on these data. For these reasons, the potential for adverse water quality impacts related to non-agricultural pesticide treatment is considered less than significant.</p>	<p><u>Mitigation Measure WQ-1:</u> No mitigation is required for this less-than-significant impact. Additional program safeguards that mitigate potential impacts to water quality include using licensed pesticide applicators with oversight by county agricultural commissioners, and monitoring by CDPR to ensure proper application of the materials. All pesticide label requirements, including those specifically intended to avoid impacts to water quality, would be followed. CDPR would sample surface water before and after PDCP pesticide treatments in non-agricultural areas. The data from environmental monitoring would be reviewed to ensure that applications do not lead to undesirable residue levels. Anomalous results would be evaluated to determine if application methods needed to be adjusted, and if so, the PDCP would require that treatments be modified accordingly.</p>	LTS
<p><u>Impact WQ-2:</u> Aerial pesticide spraying may be used in agricultural areas to implement the PDCP. Like treatments by the county in non-agricultural areas, pesticide application would be by licensed pesticide applicators according to product label directions. Pesticide label requirements specifically prohibit applicators from allowing application or drift over water bodies. In addition, pesticide labels require precautions be taken against contaminating water as a result of equipment use and cleaning. Because applicators are required to follow all pesticide label requirements to avoid adverse impacts to surface waters from direct application or runoff, the potential for adverse impacts to water quality is not considered significant.</p>	<p><u>Mitigation Measure WQ-2:</u> No mitigation is required for this less-than-significant impact. Licensed pesticide applicators would follow pesticide label requirements, including those to avoid adverse impacts to water quality.</p>	LTS

Impact	Mitigation Measures / Safeguards	Significance
<p><u>Impact WQ-3:</u> The active ingredients of some pesticides could reach ground water by infiltration from treated ground surfaces (see Appendix P). Label requirements on pesticides containing active ingredients with these attributes include measures to avoid adverse impacts to ground water. During PDCP pesticide treatment, licensed pesticide applicators would follow all pesticide label requirements. Thus, the potential for impacts to ground water are considered less than significant.</p>	<p><u>Mitigation Measure WQ-3:</u> No mitigation is required for this less-than-significant impact. Additional program safeguards that minimize effects on ground water include using licensed pesticide applicators with oversight by county agricultural commissioners. All pesticide label requirements, including those specifically for avoiding adverse impacts to ground water, would be followed. These use modifications are designed to prevent pesticides from reaching ground water at concentrations that would be considered pollution (CalEPA, 1997).</p>	LTS
<b>Biological Resources</b>		
<p><u>Impact Bio-1:</u> The PDCP includes pesticide treatments in non-agricultural areas. Treatments in non-agricultural areas could result in the loss of some non-target invertebrates with temporary effects in treatment areas. Pesticide treatments would not substantially affect any vertebrate species. The U.S. EPA and CDPR consider the potential effects of a pesticide on fish and wildlife when evaluating a pesticide proposed for registration and to determine any use restrictions necessary to ensure that it will not cause unreasonable risks to the environment. As an additional safeguard, existing Memoranda of Understanding (MOUs) and established communication procedures with CDFG, USFWS, and NMFS would ensure that take or other significant impacts to special-status species and sensitive habitats would be avoided. This potential impact is considered less than significant.</p>	<p><u>Mitigation Measure Bio-1:</u> No mitigation is required for this less-than-significant impact. Additional program safeguards to minimize potential hazards include professional application of registered pesticides and monitoring by CDPR to verify proper application rates and coverage. CDPR monitoring provides information about pesticide residues in the surrounding environment after treatment. The data from environmental monitoring would be reviewed to ensure that applications do not lead to undesirable residue levels. Anomalous results would be evaluated to determine if application methods needed to be adjusted, and if so, the PDCP would require that treatments be modified accordingly. As an additional safeguard, CDFA would notify USFWS, CDFG, and NMFS, when appropriate, of program activities. CDFA will work with these resource agencies to avoid “take” of threatened and endangered species and to minimize adverse environmental impacts to species of concern.</p>	LTS

Impact	Mitigation Measures / Safeguards	Significance
<p><u>Impact Bio-2:</u> Pesticide treatments associated with the PDCP would occur in agricultural areas and nurseries. Some agricultural areas provide important habitat for vertebrate wildlife species, including some special-status species. Nurseries are not considered important wildlife habitat. The PDCP is not expected to significantly affect any vertebrate wildlife species because the pesticides used must be in compliance with federal and state laws and regulations, and most of the pesticides approved for use are already used routinely in agricultural areas and nurseries in California. This impact is considered less than significant.</p>	<p><u>Mitigation Measure Bio-2:</u> No mitigation is required for this less-than-significant impact.</p>	LTS
<p><u>Impact Bio-3:</u> The use of pesticides in the proposed PDCP would pose risks to non-target insects. Although the PDCP would result in the mortality of some beneficial, non-target insect populations, the impacts would be temporary and limited to the application site. Populations of affected insects would recover through recolonization after treatments; therefore, the temporary loss of non-target insects is considered to be a less-than-significant impact.</p>	<p><u>Mitigation Measure Bio-3:</u> No mitigation is required for this less-than-significant impact.</p>	LTS
<p><u>Impact Bio-4:</u> Treatment procedures for the PDCP include the removal of vegetation that serves as a potential host for the glassy-winged sharpshooter or as a source of inoculum for the Pierce's disease bacterium. Vegetation removal would typically occur on unmaintained cropland, roadside vegetation, and other areas near an infestation. The PDCP does not allow the removal of any sensitive habitats or special-status plants. Therefore, this is considered a less-than-significant impact.</p>	<p><u>Mitigation Measure Bio-4:</u> As a safeguard, implementation of the PDCP would not include the removal of sensitive habitats or special-status plants. No mitigation is required for this less-than-significant impact.</p>	LTS

Impact	Mitigation Measures / Safeguards	Significance
<p><u>Impact Bio-5:</u> Non-native natural enemies of the glassy-winged sharpshooter could be released under the biological control aspect of the PDCP. Prior to the importation and release of natural enemies, CDFA evaluates them for the potential to cause adverse impacts in the state. Natural enemies would be released only after evaluation determined that the release would meet the CDFA criteria regarding reasonable avoidance of harm to beneficial, non-target organisms and the environment. Therefore, no significant impacts are anticipated.</p>	<p><u>Mitigation Measure Bio-5:</u> CDFA would evaluate foreign biological control agents prior to importation and release in California. An important phase in assessing the suitability of a new biological control agent is determining whether it could attack non-pest organisms, such as native insects, or cause harm to the environment. With these program safeguards, the potential for adverse environmental impacts would be less than significant, and no mitigation is required.</p>	<p>LTS</p>

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## **3.0 ENVIRONMENTAL SETTING**

The environmental setting for the Pierce's Disease Control Program (PDCP) includes all areas of the state where Pierce's disease and/or the glassy-winged sharpshooter could occur. This chapter describes the history and symptoms of Pierce's disease and identifies the plants susceptible to the bacterium that causes the disease, the insect vectors that transmit the bacteria, and the host plants for those vectors. An emphasis is placed on describing the glassy-winged sharpshooter and why this non-native insect has the potential to greatly increase the incidence of Pierce's disease in California. A discussion of the physical environmental conditions and regulatory setting for each resource topic analyzed in this EIR is provided in the appropriate section in Chapter 5.

### **3.1 PROJECT LOCATION**

The proposed PDCP could apply to all counties in California. Counties in which PDCP activities could take place are counties identified as having host plants potentially susceptible to Pierce's disease, and all areas capable of supporting the glassy-winged sharpshooter, a non-native insect in the leafhopper family that has the ability to spread the bacterium that causes Pierce's disease at a rapid rate.

Pierce's disease has existed in California for over 100 years. There are three factors that must be present for Pierce's disease to occur: the strain of the bacterium, *Xylella fastidiosa*, that causes the disease, susceptible grapevines, and insect carriers (vectors) that can move the bacteria from one plant to another. Native vectors have spread the bacteria within a limited range within California, resulting in Pierce's disease "hot spots" around the state. Generally these hot spots are limited by the range of the local vector. The arrival of the glassy-winged sharpshooter, a non-native pest, has greatly increased the spread of the bacteria because of its greater range of flight, ability to build to large populations, wide host range, and feeding habits. Although Pierce's disease has been in California for years, this new non-native pest is spreading the bacterium that causes the disease much faster than native vectors of the disease. Presently, Pierce's disease occurs most commonly near riparian areas and ornamental plantings in coastal California and near weedy crop fields or pastures in the San Joaquin Valley. It is spreading to grapes adjacent to citrus orchards or other habitats where the glassy-winged sharpshooter has established permanent populations.

Counties in which Pierce's disease has been reported are listed in Table 3-1. The list is based on finding one or more locations within a county where grapevines are exhibiting the symptoms of

Pierce's disease, and the symptoms are associated with the presence in the plant of *Xylella fastidiosa*. The strain of *Xylella fastidiosa* that causes Pierce's disease may be present in other counties, but if no infected, symptomatic grapevines have been found, Pierce's disease would not be reported from that county. The indication that Pierce's disease is "present" in a county does not indicate how extensive the distribution or damage from Pierce's disease is in that county. For example, in one county, the entire known infested area for Pierce's disease is one backyard. A lack of reports of Pierce's disease in a county does not necessarily mean that the pathogen is not present. *Xylella fastidiosa* can be present in numerous other plants and may be able to cause Pierce's disease if local conditions change.

**TABLE 3-1: CALIFORNIA COUNTIES WHERE PIERCE'S DISEASE HAS BEEN REPORTED TO OCCUR**

Alameda	Napa	Santa Barbara
Contra Costa	Nevada	Santa Clara
Fresno	Orange	Santa Cruz
Kern	Riverside	Solano
Kings	Sacramento	Sonoma
Los Angeles	San Bernadino	Tulare
Madera	San Diego	Ventura
Mendocino	San Joaquin	
Monterey	San Luis Obispo	

Source: Data collected by county agricultural commissioners and the University of California. Compiled by CDFA 2001.

Agricultural inspectors throughout the state have performed surveys to identify existing glassy-winged sharpshooter infestations and determine potential local control needs. Table 3-2 lists counties which are generally infested with the glassy-winged sharpshooter, as well as counties with limited infestations. Most of southern California is generally infested, with the exception of Imperial County, which has only a small area of infestation. The determination that a county is generally infested is made by the county agricultural commissioners, based on whether the glassy-winged sharpshooter is widely distributed within the county and there is no geographic barrier to prevent movement. Nine counties (Alpine, Del Norte, Inyo, Lassen, Modoc, Mono, Plumas, Sierra, and Siskiyou) are deemed not at risk of becoming infested with glassy-winged sharpshooter due to unsuitable environments. These areas are believed to not have suitable habitat to support the glassy-winged sharpshooter. A more detailed discussion of *Xylella fastidiosa*, Pierce's disease, and the glassy-winged sharpshooter is provided in subsequent sections of this chapter.

**TABLE 3-2: COUNTIES INFESTED WITH THE GLASSY-WINGED SHARPSHOOTER**

Counties Generally Infested	Counties Partially Infested
Los Angeles	Butte (5.6 square miles)
Orange	Contra Costa (3.2 sq mi)
Riverside	Fresno (56.5 sq mi)
San Bernardino	Imperial <sup>a</sup>
San Diego	Kern (3,941 sq mi)
Ventura	Sacramento (8.4 sq mi)
	Santa Barbara (293 sq mi)
	Santa Clara <sup>a</sup>
	Tulare (52.6 sq mi)

<sup>a</sup> The glassy-winged sharpshooter was recently discovered in these counties. The total area of infestation has not yet been determined.

Source: Reported by county agricultural commissioners, collected/compiled by CDFA.

### 3.2 PIERCE'S DISEASE AND OTHER PLANT DISEASES CAUSED BY THE BACTERIUM, *XYLELLA FASTIDIOSA*

Pierce's disease is a serious bacterial disease that kills grapevines. It is caused by the bacterium *Xylella fastidiosa* that, once introduced, resides in the water-conductive system (xylem) of plants. The chief function of xylem tissue is to transport water and minerals from the soil to the plant above-ground. In infected grapevines, the bacteria multiply and spread throughout the xylem, blocking water movement in the plant. Thus, many symptoms of Pierce's disease resemble water stress. Although leaf scorch is the most common symptom, other symptoms include dwarfing, wilting, and loss of chlorophyll (chlorosis) in leaves. There are a number of different host plants for the various strains of *Xylella fastidiosa*. Some develop plant diseases with similar symptoms as Pierce's disease while others may show no visible disease symptoms. Other plant diseases caused by *Xylella fastidiosa* are known, as described later in this section. Highly susceptible host plants, such as grapes, frequently die within a year after becoming infected.

Pierce's disease occurs in vineyards across the southern United States, from Florida through Texas and into California. In the East, it extends up to Virginia. In the West, it has not been found north of California. In general, the disease is rare and less severe in areas that are farther north or at higher elevations. The geographical distribution of Pierce's disease appears to be related to the inability of the bacteria to survive low winter temperatures; however, the effect of low winter temperatures on bacterial survival is not well understood. The strain of *Xylella fastidiosa* responsible for Pierce's disease in grapes is widely distributed in the southern United States and extends southward through Mexico, Central America, and South America, where it has been

reported in Venezuela and Chile. Reports have also been made of its occurrence in Europe. Currently, there is no known cure for the disease.

A number of factors are required for Pierce's disease to develop. In addition to needing the *Xylella fastidiosa* bacteria, factors include susceptible grapevines, alternative host plants, favorable environmental conditions, and vectors (xylem-feeding insects).

### 3.2.1 MODES OF TRANSMISSION OF XYLELLA FASTIDIOSA TO GRAPEVINES

*Xylella fastidiosa* multiplies in the xylem vessels of a host plant's leaves, stems, and roots. It will also multiply in the foregut of an insect vector, where large quantities of xylem fluid from plant hosts pass through during feeding. The bacteria are not seed-borne in plants, nor are they transmitted through the eggs of insect vectors.

To grow, *Xylella fastidiosa* must reach the xylem of a host plant or the foregut of an insect vector. The bacterium lacks the enzymes needed to penetrate cell walls. Therefore, the bacteria must be placed within the xylem to successfully colonize in a host plant. In nature, this is accomplished by xylem-feeding insect vectors, such as sharpshooters (Cicadellidae) and spittlebugs (Cercopidae). A description of the glassy-winged sharpshooter and other vectors of *Xylella fastidiosa* is provided in Section 3.3.

The pattern and incidence of Pierce's disease in a vineyard is related to which vector is infesting the vines in that region. The location on the vine where the bacteria are introduced and the time of year that infection occurs determine whether or not the bacteria will remain in the vine over the winter and cause disease symptoms in the spring.

Winter pruning removes first-year infections from current season's growth, especially infections that occur late in the season. However, if there is sufficient time for the bacteria to move from the area of infection to permanent parts of the vine before dormancy, then *Xylella fastidiosa* remains in the vine after winter pruning. In a chronically infected vine, although spring symptoms of Pierce's disease may be present, the bacteria do not move up into the new season's growth until May or June. As a result, an uninfected sharpshooter feeding on succulent vine growth may not acquire bacteria from these vines until the summer months.

Transmission of *Xylella fastidiosa* can also be accomplished by grafting material from an infected vine onto a healthy vine. As new xylem connections are established, the bacteria can invade. Propagation from cuttings of an infected vine would also result in the new plant being infected. However, infected dormant cuttings are normally short-lived.

Artificial inoculations can be accomplished by using a needle (or similar device) carrying the bacteria, which is used to penetrate the xylem and deposit the bacteria in an environment suitable for growth. Dr. Andrew Walker, University of California, Davis, has recently confirmed the movement of *Xylella fastidiosa* on pruning shears used to clip succulent tissues on vines actively growing in a greenhouse. The same pruning shear was used on infected vines and uninfected vines. In time, the healthy plants developed symptoms of Pierce's disease. However, there is no evidence of movement of *Xylella fastidiosa* via pruning shears used to prune dormant vines. If this were a viable means of transmission, significant numbers of vines would have been killed during the last century in California, as infection via this route would have placed *Xylella fastidiosa* in wood that was not likely to be removed during the next dormant season. In fact, vines infected via natural vectors late in the growing season may have the infected wood removed during dormant pruning, thereby "curing" the vine.

Available information indicates that *Xylella fastidiosa* is very exacting in its nutritional requirements, so survival outside of host plant xylem or an insect vector would be very limited. No evidence has been found that the bacteria would survive in the soil or in composted plant material, due to competition from other microorganisms. The same would hold true for movement in irrigation or rainwater. Although the bacteria might be carried in the water (should they somehow be placed there) deposition of the bacteria on the surface of the plant would not result in infection. Infected prunings left in the vineyard, once they have dried somewhat so they would no longer be attractive to a vector, pose no risk of initiating new infections. *Xylella fastidiosa* remaining in the prunings would gradually die as the wood dries and is attacked by other microorganisms.

### **3.2.2 GRAPEVINE SUSCEPTIBILITY**

All grape varieties grown commercially in California (*Vitis vinifera*) are susceptible to Pierce's disease, but they vary in levels of tolerance (see Table 3-3). The bacteria spread more slowly in some varieties than in others. In vineyards with a history of high incidence of Pierce's disease, even the most tolerant varieties have significant vine loss.

Young vines are more susceptible than mature ones, probably because very little wood is pruned from young vines. This causes more infected wood to be retained. It is also possible that the bacteria can move faster through younger vines than through older vines. Both variety and age determine how long a vine with Pierce's disease can survive. One-year-old Chardonnay or Pinot Noir vines can die the year they become infected. Ten-year-old Chenin Blanc or Ruby Cabernet vines can live with chronic infections for several years, although they will not bear a full crop.

Rootstocks vary widely in susceptibility, however rootstocks do not impart resistance to *vinifera* varieties grafted onto them. Grafting does not affect susceptibility of grapevines. In other words, if a plant has a tolerant rootstock, but has been grafted to a susceptible vine variety, the plant will not be resistant to Pierce's disease.

**TABLE 3-3: TOLERANCE LEVELS OF COMMERCIALY GROWN CALIFORNIA GRAPE VARIETIES TO PIERCE'S DISEASE**

Most Susceptible	Less Susceptible	Least Susceptible (Most Tolerant)
Barbera	Cabernet Sauvignon	Chenin Blanc
Calmeria	Crimson Seedless	Ruby Cabernet
Chardonnay	Flame Seedless	Sylvaner
Emperor	French Columbard	Thompson Seedless
Fiesta	Grey Riesling	White Riesling
Mission	Merlot	Zinfandel
Pinot Noir	Napa Gamay	
Red Globe	Petit Sirah	
	Ruby Seedless	
	Sauvignon Blanc	

Source: Varela, et. al., 2001.

### 3.2.3 OTHER PLANT DISEASES CAUSED BY *XYLELLA FASTIDIOSA*

Pierce's disease is not the only plant disease caused by *Xylella fastidiosa*. Several strains of *Xylella fastidiosa* exist, attacking and causing damage to different host plants. The *Xylella fastidiosa* bacteria have a wide host range, with various strains occurring naturally in over 65 species of plants in a number of plant families (see Appendix B). *Xylella fastidiosa* infections may be localized, or the bacteria may spread systemically throughout the plant. The role that each plant species plays as a reservoir of the bacteria depends on how *Xylella fastidiosa* functions within the plant and whether an insect vector feeds on it. *Xylella fastidiosa* acts differently in each plant

species, depending on how rapidly the bacteria can multiply, how the bacteria move within the xylem, and the maximum population density (Varela, et. al, 2001).

Not all infected plants show symptoms, even though bacteria can be readily recovered from the plant and transmitted by vectors to other plants. *Xylella fastidiosa* may exist in one of two conditions within a plant, depending on the plant species: 1) the bacterium may be present but cause no visible disease symptoms (e.g. blackberry); or 2) it may severely damage or kill the plant (e.g. commercially grown California grapes, almonds, or citrus). *Xylella fastidiosa* is the causal agent of a number of diseases of food and ornamental plants (Table 3-4).

**TABLE 3-4: PLANT DISEASES CAUSED BY XYLELLA FASTIDIOSA**

Disease	Host	Kills Host	Severity of Damage	Present in California
Pierce's disease	grape	yes	high	yes
Almond leaf scorch	almond	yes	high	yes
Oleander leaf scorch	oleander	yes	high	yes
Phony peach disease	peach	no	high	no
Alfalfa dwarf disease	alfalfa	no	slight to moderate	yes
Citrus variegated chlorosis	citrus	no	high	no
Bacterial leaf scorch of elm	elm	no	moderate to high	no
Bacterial leaf scorch of sycamore	sycamore	no	moderate to high	no
Pear scorch	pear	no	moderate	no
Bacterial leaf scorch of oak	oak	no	moderate to high	?*
Maple leaf scorch	maple	no	moderate to high	?*
Mulberry leaf scorch	mulberry	no	moderate	no
Pecan leaf scorch	pecan	no	moderate	no

Source: Dowell, 2001.

\* Rarely found in California. When found, affected trees exhibit milder symptoms than those observed in the eastern U.S., suggesting a more virulent strain is present in the east.

### 3.3 GLASSY-WINGED SHARPSHOOTER AND OTHER VECTORS OF PIERCE'S DISEASE

As noted previously, the primary means of transmitting Pierce's disease is through insect vectors that carry the bacterium, *Xylella fastidiosa*, and inject it into the xylem fluid of plants while feeding. A description of the glassy-winged sharpshooter and other key insect vectors that can transmit the bacteria is provided in this section.

### 3.3.1 VECTORS OF PIERCE'S DISEASE

Insect vectors capable of spreading *Xylella fastidiosa* belong to the sharpshooter subfamily of the leafhopper family (Cicadellidae) and to the spittlebug family (Cercopidae). These xylem-feeding insects acquire bacteria while feeding on infected plants. Bacteria attach to the mouthparts and multiply, forming a bacterial plaque. During subsequent feeding bacteria dislodge from the insect's mouth and enter the plant's xylem. Sharpshooters and spittlebugs are able to transmit the bacteria almost immediately after acquiring them from an infected plant. Less than 100 bacteria per insect are required for transmission. Once the adult acquires the bacteria, the insect remains capable of transmitting it throughout its life. Immature insects remain infected until they molt, at which time the bacteria are shed with the lining of the mouth along with the outer skin. Newly molted insects have to reacquire the bacteria by feeding on an infected plant. Bacteria are not transferred from infected females to their offspring.

Several native insects can acquire and transmit *Xylella fastidiosa* (Table 3-5) (Dowell, 2001) in addition to the non-native glassy-winged sharpshooter (see Appendix B). Native vectors of *Xylella fastidiosa* can be found throughout California. Key native vectors include the blue-green sharpshooter (*Graphocephala atropunctata*), the green sharpshooter (*Draeculacephala minerva*), and the red-headed sharpshooter (*Xyphon (Carneocephala) fulgida*). The blue-green sharpshooter (Figure 3-1) is native to California and is the vector that is most responsible for the spread of *Xylella fastidiosa* in coastal vineyards. Major vectors in the San Joaquin Valley are the green sharpshooter (Figure 3-2) and the red-headed sharpshooter (Figure 3-3). These two vectors also contribute to the spread of the bacteria in some coastal regions. The reported distribution of key vectors of *Xylella fastidiosa* are given in Figures 3-1 through 3-4. The actual distribution of native vectors is probably greater than shown because few people bother to report the occurrence of these common native insects.

**TABLE 3-5: PARTIAL LIST OF XYLELLA FASTIDIOSA VECTORS IN CALIFORNIA**

Scientific Name	Common Name
<b>Sharpshooters</b>	
<i>Cuernia occidentalis</i>	occidental sharpshooter
<i>Cuernia yuccae</i>	
<i>Draeculacephala californica</i>	California sharpshooter
<i>Draeculacephala crassicornis</i>	
<i>Draeculacephala minerva</i>	grass or green sharpshooter
<i>Draeculacephala noveboracensis</i>	
<i>Friscanus friscanus</i>	lupine sharpshooter
<i>Graphocephala atropunctata</i>	blue-green sharpshooter
<i>Graphocephala confluens</i>	willow sharpshooter
<i>Graphocephala hieroglyphica</i>	
<i>Homalodisca coagulata</i>	glassy-winged sharpshooter
<i>Homalodisca lacerta</i>	smoketree sharpshooter
<i>Pagaronia confusa</i>	
<i>Pagaronia furcata</i>	
<i>Pagaronia tredecimpunctata</i>	
<i>Pagaronia triunata</i>	
<i>Xyphon (Carneocephala) fulgida</i>	red-headed sharpshooter
<b>Spittlebugs</b>	
<i>Aphrophora angulata</i>	
<i>Aphrophora permutata</i>	
<i>Clastoptera brunnea</i>	
<i>Philaenus spumaria</i>	meadow spittlebug

Note: Common names have been provided where they are available. Not all of the vectors in Table 3-5 have common names.

Source: Dowell, 2001.

At present there is a dynamic balance between the presence of the native vectors, *Xylella fastidiosa*, and susceptible host plants. Most growers know where there are “hot spots” of disease in their region caused by the presence of large numbers of native vectors to spread the pathogen. These can often be avoided. The glassy-winged sharpshooter, however, has the potential to disrupt this dynamic by spreading the pathogen to areas which are normally beyond the range of native vectors.

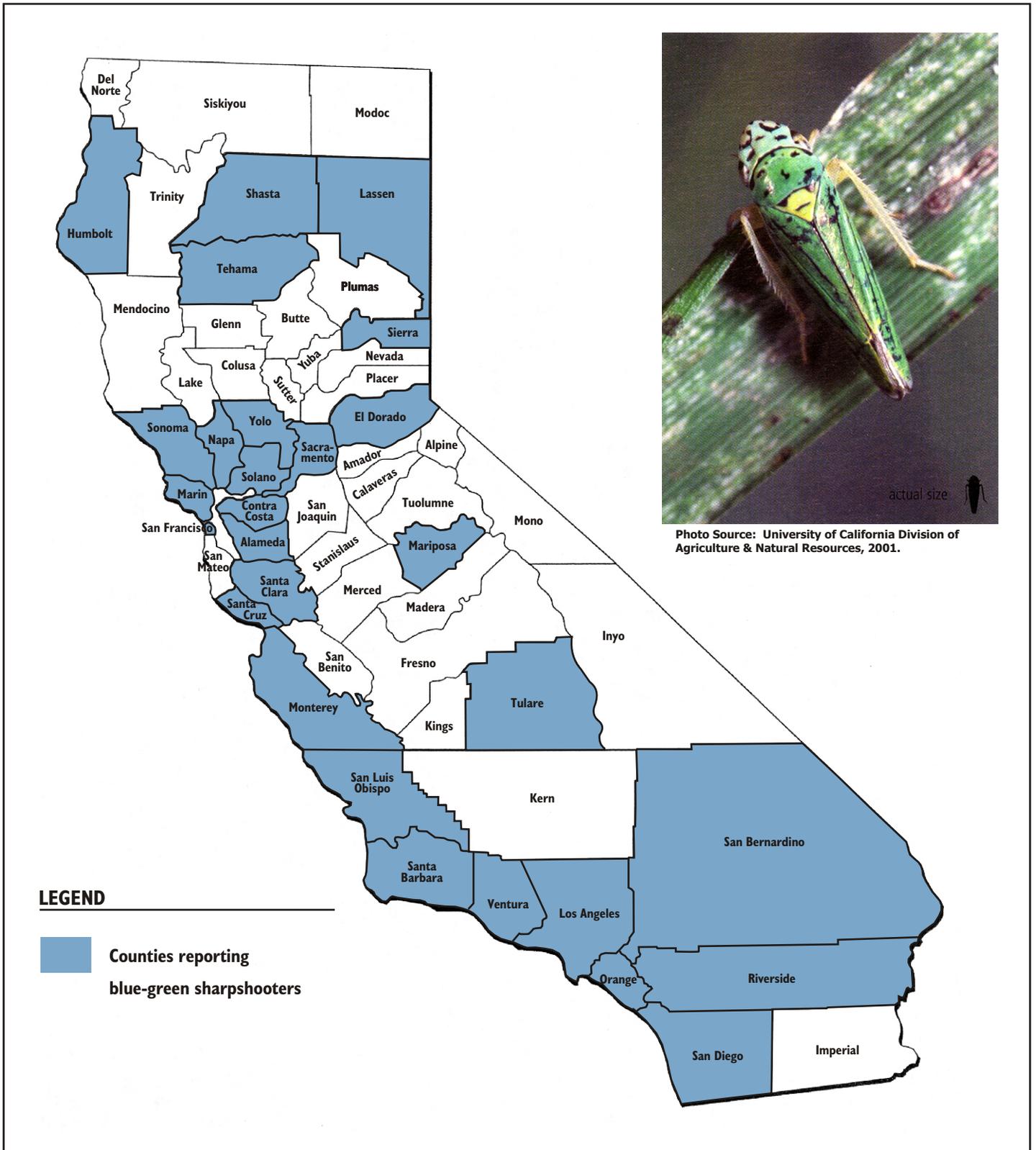
The glassy-winged sharpshooter (*Homalodisca coagulata*) (Figure 3-4) is a non-native insect that was introduced into southern California around 1989. It is now widespread there. Several characteristics of the glassy-winged sharpshooter give it the potential to dramatically increase the severity of Pierce’s disease in California. Table 3-6 compares the transmission efficiency, common breeding habitats and host plants, frequency of vector occurrence in those habitats, and the

potential movement into vineyards for the glassy-winged sharpshooter and key native vectors of Pierce's disease in California. The glassy-winged sharpshooter feeds and reproduces on a wide range of plant types in diverse habitats, where it can reach very high populations. It is a strong flier, so it can move deeply into vineyards that are adjacent to these habitats. Until now, because of the limited dispersal ability of the blue-green, green, and red-headed sharpshooter and other native vectors, Pierce's disease has been primarily localized near the habitats of these vectors. These habitats include riparian corridors, certain ornamental landscapes, and lush growing grasses. However, the glassy-winged sharpshooter breeds in citrus, avocado, macadamia, eucalyptus, sumac, and numerous other plants where the population can reach large numbers. These plants previously did not serve as hosts for Pierce's disease vectors. Consequently, the distribution characteristics of the disease are likely to change. For further information regarding the relationship between *Xylella fastidiosa* and native vectors, please see Appendix B.

**TABLE 3-6: PIERCE'S DISEASE VECTORS: BACTERIAL TRANSMISSION EFFICIENCY AND HABITATS**

Vector	Glassy-winged sharpshooter	Blue-green sharpshooter	Green sharpshooter	Red-headed sharpshooter	Spittlebugs
<b>Bacteria transmission efficiency</b>	Low	High	Low	High	High
<b>Breeding habitat</b>	Crops, riparian areas, ornamental landscapes, native woodlands, weeds	Riparian areas, some ornamental landscapes	Grasses in wet areas	Grasses in wet areas, but tolerates drier conditions	Riparian areas, ornamental landscapes, weeds
<b>Breeding hosts</b>	Woody perennials, herbaceous plants	Woody perennials	Sedges, nutgrass, water grass, ryegrass, fescue grass	Bermudagrass, semi-aquatic grasses	Grasses, herbaceous plants
<b>Occurrence in breeding habitat</b>	Very frequent	Frequent	Frequent	Sporadic	Frequent
<b>Movement into vineyard</b>	Widespread	Along riparian edge	Along irrigated pastures and ditches	Along irrigated pastures and ditches; may breed on bermudagrass in vineyards	Only adults along riparian edge; carried by wind beginning in May

Source: Varela, et. al., 2001.



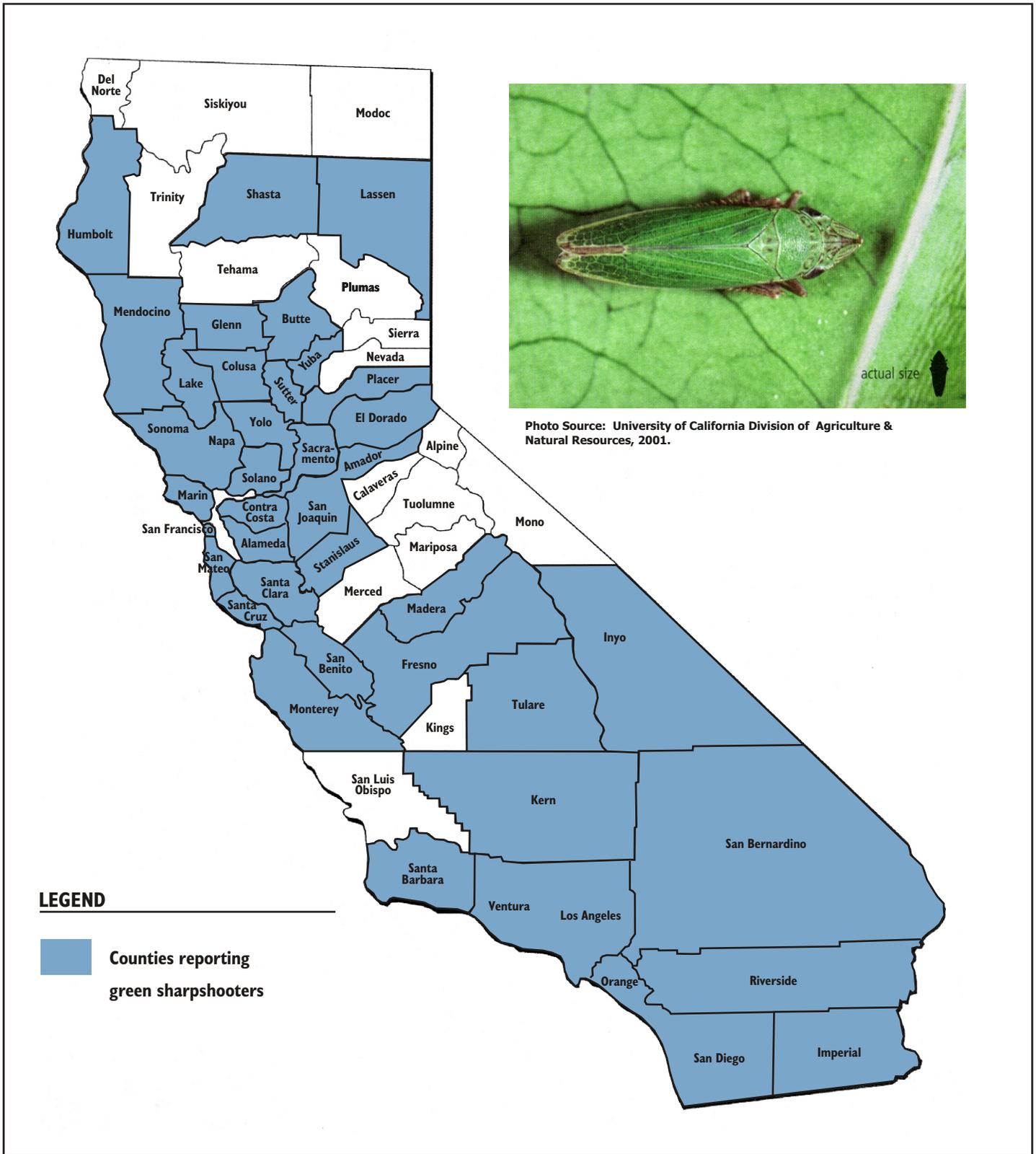
Source: CDFA, 2001

**Figure 3-1 : Distribution of Blue-green Sharpshooter in California**

Pierce's Disease Control Program EIR







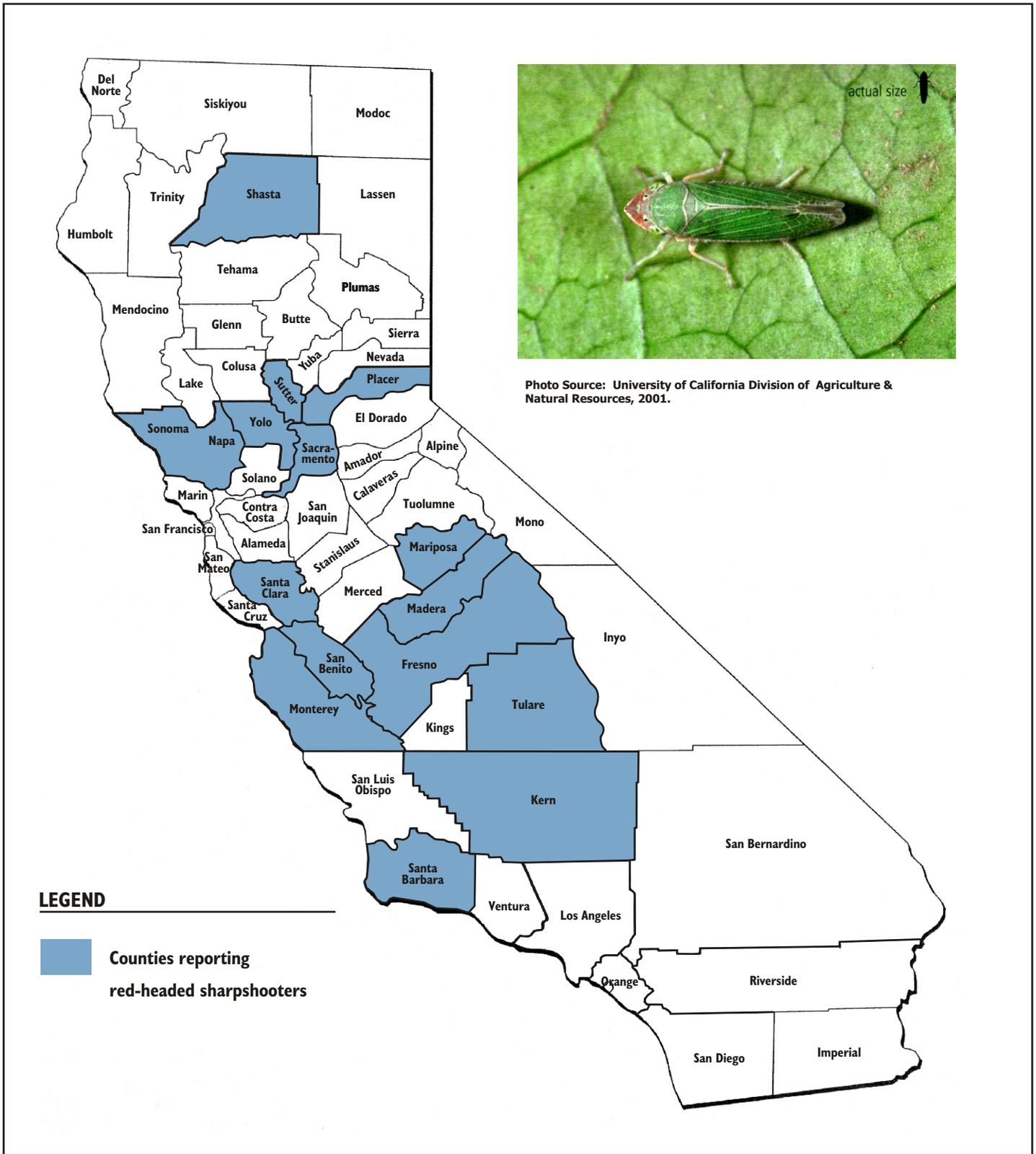
Source: CDFA, 2001

**Figure 3-2 : Distribution of Green Sharpshooter in California**

Pierce's Disease Control Program EIR







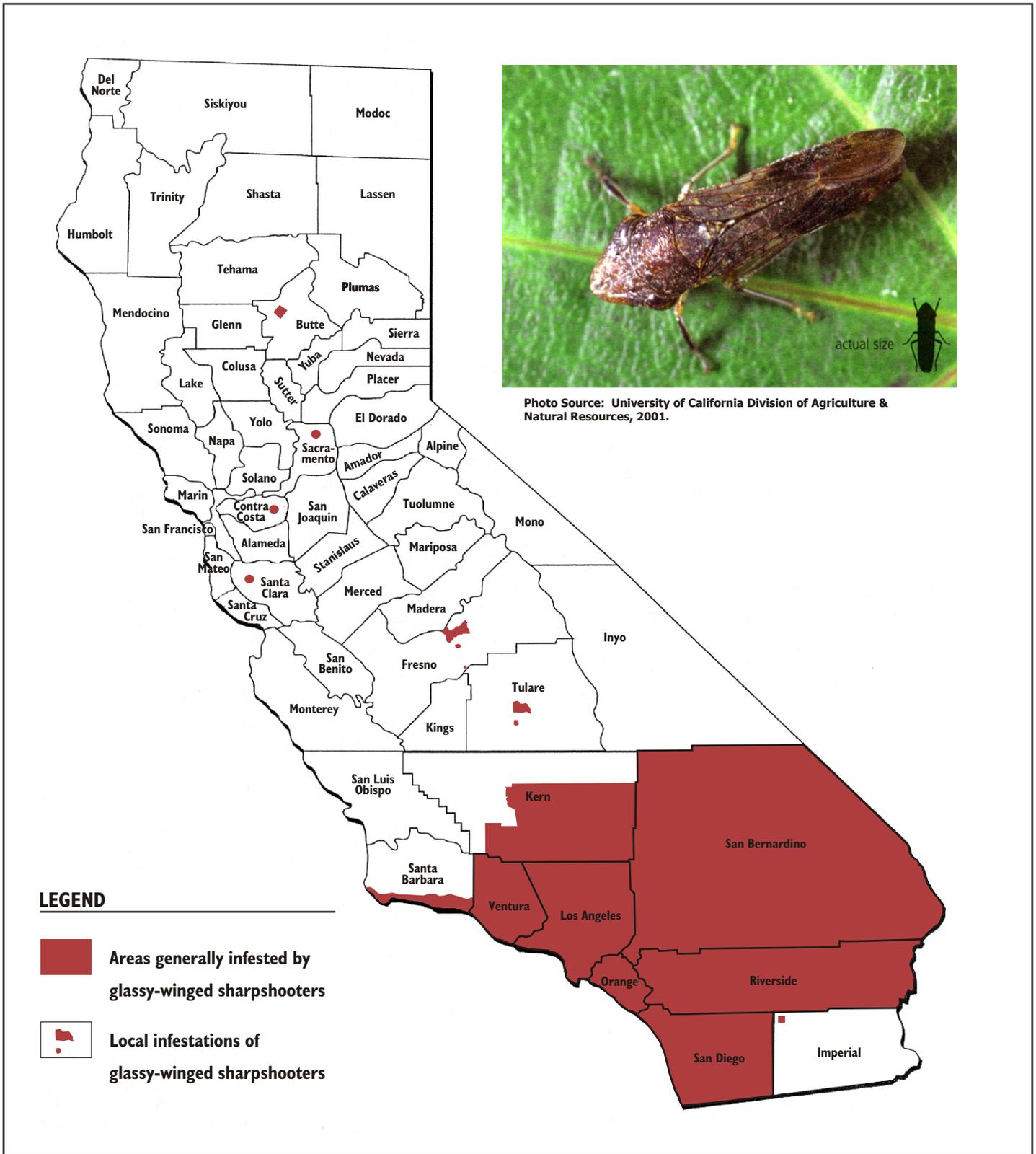
Source: CDFA, 2001

**Figure 3-3 : Distribution of Red-headed Sharpshooter in California**

Pierce's Disease Control Program EIR







**Figure 3-4 : Distribution of Glassy-winged Sharpshooter in California**

Pierce's Disease Control Program EIR





### 3.3.2 BIOLOGY OF GLASSY-WINGED SHARPSHOOTER (LIFECYCLE)

The adult glassy-winged sharpshooter is almost ½ inch (13 mm) long (Figure 3-4). It is dark brown to black with a lighter underside. The upper parts of the head and back are stippled with ivory-to-yellowish spots; the wings are partly transparent with reddish veins. The female secretes a white substance that she stores at either side of the wings. These appear as two large white spots. These spots rub off as the female contacts foliage, and uses the substance to coat her egg masses.

The glassy-winged-sharpshooter's lifecycle depends on environmental conditions. Throughout most of California, the glassy-winged sharpshooter has two generations per year. It reproduces on a large number of native plants, agricultural crops, ornamentals, and weeds. Oviposition (egg-laying) occurs in late February through May and again in mid-to-late summer. Eggs are laid in a mass on the underside of leaves, usually in groups of 10 to 12 eggs, but ranging from 1 to as many as 30. The eggs are laid beneath the leaf epidermis. The upper leaf surface above an egg mass may be marked over time by a yellowish elongated blotch. After hatching, the spent egg mass appears as a tan to brown scar.

Nymphs go through five immature stages, and first generation adults begin to appear in May and continue to be present through late August. Second-generation egg masses are laid in June through late September and develop into overwintering adults. This developmental pattern results in overlapping generations in which each life stage reaches its highest level some time between June and October each year.

The glassy-winged sharpshooter differs from native vectors in several important biological traits (Table 3-7). The glassy-winged sharpshooter resides in a wide range of habitats that include agricultural crops, ornamentals, native woodlands, and riparian vegetation, and it is reported to feed and lay eggs on over 700 plant species. Although it prefers succulent plant growth, it will feed on growth that is less succulent, including shoots and woody stems. The CDFA Plant Quarantine Manual (Appendix D) includes a list of plant hosts on which glassy-winged sharpshooter life forms have been documented in either California or the southeastern United States. Citrus is a favored host in southern California but very high glassy-winged sharpshooter populations also have been observed on avocado, crape myrtle, and several species of woody ornamentals. Other favored plants include eucalyptus and various ornamental plants. Native hosts include both evergreen and

deciduous oaks, sycamore, and laurel sumac. Host plant preference changes according to host availability and the nutritional value of the host plant at a given time.

When feeding, the glassy-winged sharpshooter excretes copious amounts of watery excrement in a steady stream of small droplets. This “sharpshooter rain” can be a messy nuisance. When dry, the excrement can give plants a whitewashed appearance.

**TABLE 3-7: COMPARISON OF BIOLOGICAL TRAITS OF THE GLASSY-WINGED SHARPSHOOTER AND NATIVE *XYLELLA FASTIDIOSA* VECTORS**

Trait	Glassy-winged Sharpshooter	Native Vectors
Breeds extensively in crops like citrus or grapes	Yes	No
Confined to areas near grassland/riparian settings	No	Yes
Typical movement more than 300 feet from breeding sites	Yes	No
Reaches great numbers in crop systems	Yes	No
Effective <i>Xylella fastidiosa</i> vectors	Yes	Yes
Common in urban settings	Yes	only blue-green sharpshooter
Feeds on larger, older plant tissue	Yes	No
Feeds on dormant grapevines	Yes	No
Changes host plants frequently	Yes	No

Source: Dowell, 2001.

### 3.3.3 GLASSY-WINGED SHARPSHOOTER NATURAL ENEMIES

The glassy-winged sharpshooter is native to the southeastern U.S. and northeastern Mexico where naturally occurring enemies keep population sizes down, making sharpshooters difficult to find (CDFA, 2001j). In California, natural glassy-winged sharpshooter enemies include tiny parasitic wasps and the larvae of green lacewings. The predominant parasitoid wasp in California, *Gonatocerus ashmeadi*, is a tiny wasp (1.5 mm long) that parasitizes up to 50 percent of the glassy-winged sharpshooter egg masses in the early spring and as many as 80 to 95 percent in the late summer months. Although this tiny stingless wasp readily attacks sharpshooter eggs in late summer, it is not enough to prevent outbreaks of glassy-winged sharpshooters in the late spring and early summer. Lacewings, like other generalist predators, do not specialize in attacking the glassy-winged sharpshooter, and will not actively seek the glassy-winged sharpshooter, especially when the number of glassy-winged sharpshooter is low. For this reason, the PDCP is exploring the use of imported natural enemies to attack the glassy-winged sharpshooter eggs in the spring and other

predators to attack the immature stages of the glassy-winged sharpshooter. More information about the PDCP biological control program is provided in Chapter 4.

### 3.4 RAMIFICATIONS OF GLASSY-WINGED SHARPSHOOTER SPREAD

Recent outbreaks of the glassy-winged sharpshooter in southern California and parts of Kern County have raised the possibility that there may be an increase in the incidence of Pierce's disease and other *Xylella fastidiosa* – caused plant diseases in California. As the glassy-winged sharpshooter spreads throughout the state, devastating damage potentially could occur to grapes and other plants susceptible to *Xylella fastidiosa* throughout the state. There is evidence that the spread of the glassy-winged sharpshooter has the following ramifications (Dowell, 2001):

- **Movement of *Xylella fastidiosa* to areas now free of the pathogen.** In both Riverside (Temecula) and Kern Counties, Pierce's disease has been seen in areas previously believed to be free of the disease. In Temecula, vineyards throughout the valley now have vines showing Pierce's disease symptoms. In Kern County, the occurrence of Pierce's disease in the General Beale Road area represents a new area of disease incidence. These new areas are not simply due to a greater awareness of the disease and increased vigilance. Over the past five years, searches in Kern County by University of California (UC) Cooperative Extension personnel did not find Pierce's disease in Bakersfield or the area south of Bakersfield.
- **Movement of *Xylella fastidiosa* to new plant species causing diseases not seen before in California.** Oleander leaf scorch was discovered in California in 1994. The disease is killing oleander plants and is associated with the glassy-winged sharpshooter. There is potential for the sharpshooter to move *Xylella fastidiosa* to other plants causing additional "new" diseases as it spreads into habitats not occupied by native vectors.
- **Increase in grapevine loss.** The percentage of grapevines that have died or are in severe decline due to Pierce's disease in Temecula increased from less than 1% in 1990 to an average of nearly 30% in 2000, based on the total acreage of grapevines present in 1990. This represents a 30-fold increase in the disease in less than ten years. This increase is because the sharpshooter is taking the pathogen to vineyards previously beyond the "reach" of native vectors, and because large numbers of pathogen-carrying sharpshooters are invading susceptible plantings and moving the pathogen from infected plants to nearby uninfected plants.

- **Increase in the spread of *Xylella fastidiosa* within plantings of susceptible crops/plants.** Typical *Xylella fastidiosa* spread within California vineyards by native vectors varies from less than 1% to 10% in sites with heavy pressure from native vectors. The rate of *Xylella fastidiosa* infection rises and falls unpredictably from year to year. In Temecula, there have been steeper increases in the incidence of Pierce's disease with Pierce's disease spreading throughout vineyards in 2 to 3 years. If Temecula represents a typical situation for *Xylella fastidiosa* spread by glassy-winged sharpshooters, the rate at which the pathogen is spread throughout the rest of California will grow severely, depending upon the spread rate of glassy-winged sharpshooter throughout California.
- **Creation of patches of diseased plants rather than isolated individuals.** Native vectors inhabit natural weedy habitats and infect few plants on forays into vineyards. A combination of movement of *Xylella fastidiosa* from outside the vineyard to individual plants and the site of infection by native vectors (see below) limited the physical distribution of infected plants to individual vines scattered within a 300 foot swath bordering the native vegetation in which the native vectors breed. Because the glassy-winged sharpshooter breeds in cultivated crops and ornamental plants, there would be multi-plant disease centers as the sharpshooter spreads the pathogen from a diseased plant to its neighbors -- something that appears to be negligible with native vectors. Summer infections of grapes by native vectors occur in new growth, which is usually removed by pruning and therefore does not remain to the following year, explaining why vine-to-vine movement of chronic Pierce's disease has not been observed before the arrival of the glassy-winged sharpshooter. These multi-plant disease centers, caused by plant-to-plant transmission, have already been seen in grapes and oleanders in Southern California.
- **Movement of the pathogen into non-agricultural settings.** The occurrence of oleander leaf scorch in urban, farm and freeway settings indicates that glassy-winged sharpshooters may be moving this pathogen into new settings, especially in non-agricultural areas.
- **Infection of vines below the point at which they are pruned in the winter.** Glassy-winged sharpshooters have been frequently observed feeding on pruned, dormant grapevines. The infection of the vines early in the season and below the pruning point throughout the year will greatly increase the rate at which grapevines will be infected with *Xylella fastidiosa*. In contrast, native vectors of *Xylella fastidiosa* feed on and transmit *Xylella fastidiosa* to the tips of growing grape stems in the summer. Because the season's growth is typically pruned, these infections seldom survive the following winter.

These changes threaten to dramatically alter the dynamics of *Xylella fastidiosa*-caused plant diseases in California. Virtually all the grape growing regions of California could experience an increase in Pierce's disease incidence, including areas that have historically had such low infection levels as to be considered "free" of the disease.

Other plantings are being affected by the glassy-winged sharpshooter, including oleanders and citrus. The glassy-winged sharpshooter may transmit the pathogen to new host plants, as happened with oleander leaf scorch. It may increase the incidence of other *Xylella fastidiosa* caused plant diseases already found in California, including bacterial leaf scorch of oak, maple leaf scorch, alfalfa dwarf, and almond leaf scorch. The presence of the glassy-winged sharpshooter also puts other crops at risk should the strains of *Xylella fastidiosa* that attack citrus and peach be brought to the state.

### **3.5 PHYSICAL ENVIRONMENTAL SETTING**

PDCP activities potentially could occur in every area of the state in which Pierce's disease and/or the glassy-winged sharpshooter is present, or may exist. As previously noted, the glassy-winged sharpshooter resides in a wide range of habitats including agricultural crops, ornamentals, woodlands, and riparian vegetation. The glassy-winged sharpshooter is reported to feed and reproduce on over 700 plant species. A list of glassy-winged sharpshooter host plants is provided in the CDFA Plant Quarantine Manual (Appendix D). Because of the diversity and abundance of glassy-winged sharpshooter host plants in California, CDFA has determined that this pest and therefore subsequent treatment potentially could occur in nearly every area of the state. For this reason, the proposed PDCP potentially covers all of California. In non-agricultural areas, PDCP control measures could be necessary in a variety of habitats, including residential yards, commercial and industrial areas, and public land, such as parks and transportation right-of-ways.

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## **4.0 PROGRAM DESCRIPTION**

The proposed Pierce's Disease Control Program (PDCP) would be a continuation of the comprehensive, statewide control program and emergency regulations currently being conducted in California. The California Department of Food and Agriculture (CDFA) is the agency responsible for coordinating the statewide comprehensive control program, and is the Lead Agency for this EIR. The county agricultural commissioner, or other agency designated by the Board of Supervisors of each county, would have the lead responsibility for local implementation of the program, with coordination by CDFA. Although the PDCP applies to the entire state, not all counties are currently identified as potentially threatened. Figure 4-1 identifies areas within California that are generally infested with the glassy-winged sharpshooter, have limited infestations, or are counties at risk. Most of southern California is generally infested, with the exception of Imperial County, which only has a small area of infestation. For more information regarding the current extent of Pierce's disease and the glassy-winged sharpshooter, please refer to Chapter 3.

This chapter presents the purpose of this EIR, the goals and objectives of the program, the legal basis for its implementation, and the process CDFA and local agencies would follow to implement local control programs. In addition, it discusses the five central elements of the PDCP: public outreach, statewide survey, contain the spread, local management/rapid response, and research. The PDCP, including these central elements, would be implemented through the activities described in this EIR. The PDCP would also be implemented by the adoption of regulations by CDFA and the approval of protocols, guidelines, workplans, and other elements developed to implement the PDCP. Standards and prescriptions for the emergency program have been adopted by emergency regulations contained in CCR Title 3, Chapter 4, Section 3650-3660. These regulations may be amended as necessary to carry out the proposed program described herein, and to further define the roles and responsibilities of CDFA and local agencies. The regulations would be subjected to additional public review and comment, and may be amended for clarification and simplification as needed. CDFA may provide logistical support, including carrying out any activity which is the responsibility of the designated local agency. In so doing, CDFA would adhere to all safeguards and conditions described in this EIR.

## 4.1 PURPOSE OF THIS EIR

This is a programmatic EIR for a statewide effort to control Pierce's disease and the glassy-winged sharpshooter. It is intended to cover implementation of the proposed PDCP by state and local jurisdictions. As Lead Agency, CDFA has prepared this Draft EIR to identify environmental effects that could result with implementation of the PDCP. This EIR has been prepared in accordance with, and in fulfillment of, the California Environmental Quality Act (CEQA) (Public Resources Code Sections 21000-21177) and the State CEQA Guidelines (CCR Title 14, Chapter 3, Sections 15000-15387). CDFA is the Lead Agency for this program and its CEQA review. The Real Estate Services Division of the California Department of General Services has assisted CDFA with the CEQA review of the PDCP.

This EIR is an informational document that is to be used in the planning and decision-making process. It is not the purpose of an EIR to recommend approval or denial of a project. CEQA requires decision-makers to balance the benefits of a proposed project against its environmental consequences.

## 4.2 PROGRAM GOALS AND OBJECTIVES

The overall goal of the proposed PDCP is to minimize the statewide impact of Pierce's disease and glassy-winged sharpshooter. This is in keeping with the overall goal of the entire Pest Prevention program of CDFA, which is to protect California's citizens, environment, and economy from the ravages of serious invasive pests. Program objectives to achieve this goal are listed below.

- Determine the current distribution of glassy-winged sharpshooter in California and establish a mapping and data collection system to track and report new detections and infestations.
- Develop and disseminate information about the nature, characteristics, and impact of Pierce's disease and the glassy-winged sharpshooter on various commodities as well as on the economy and quality of life in California.
- Provide training in biology, detection, and treatment of Pierce's disease and its vectors.
- Develop a research program that will aid in the management of, and ultimately find a remedy for, Pierce's disease.



Source: CDFA, September, 2001

**Figure 4-1 : Project Location**

Pierce's Disease Control Program EIR





- Contain the spread of glassy-winged sharpshooter and Pierce's disease until researchers can find a treatment, cure, or solution.
- Prevent artificial spread of glassy-winged sharpshooter through a coordinated program that involves regulating the movement of commodities that may carry the glassy-winged sharpshooter, such as nursery stock and bulk citrus.

### **4.3 LEGAL BASIS FOR THE PIERCE'S DISEASE CONTROL PROGRAM**

Pursuant to California law, CDFA is responsible for protecting the state's agriculture and environment from non-native pests. Existing law requires CDFA to protect and promote the state's agriculture (Food and Agricultural Code [FAC] Section 401). CDFA is obligated to prevent the introduction and spread of injurious insect and animal pests, plant diseases, and noxious weeds (FAC Section 403). The Secretary of Food and Agriculture has authority to establish, maintain and enforce quarantine, eradication and such other regulations as are necessary to circumscribe, exterminate or prevent the spread of any pest not generally distributed within this state (FAC Sections 5321 and 5322). CDFA and the state's agricultural commissioners are to use all reasonable means to control or eradicate newly discovered pests (FAC Sections 5251 through 5254).

The Legislature specifically mandated that CDFA and the counties develop a program and individual county workplans to address the impacts of Pierce's disease and its vectors. The various Legislative mandates for preventing the introduction, eradicating, and controlling non-native pests in general, and specifically the glassy-winged sharpshooter, are located in the Food and Agricultural Code. Sections relevant to the PDCP are presented in Appendix E.

Pests can pose a threat to human health, domestic animals, wildlife, and public and private property. Failure to maintain real property so as to allow infestation by a pest, like the glassy-winged sharpshooter, constitutes a public nuisance (FAC Section 5401). It is unlawful to maintain such a nuisance (FAC Section 5402). These statutes are codified in Chapter 6, Part 1, Division 4 of the Food and Agricultural Code, and they are an exercise of the government's powers to abate nuisances. Nuisance abatement may not be exercised capriciously without regard for landowners. Where an infestation constitutes a nuisance, substantive law and legal procedures provide for abatement.

The State Legislature has twice enacted specific statutory provisions to address Pierce's disease and the glassy-winged sharpshooter. The first bill, Assembly Bill 1232, was enacted in October 1999. It mandated creation of an advisory task force and appropriated \$750,000 per year for three years for Pierce's disease research (FAC Section 12798.1). A second bill, Senate Bill 671 was enacted in May 2000. SB 671 recognized the clear and present danger presented by Pierce's disease and the glassy-winged sharpshooter, and mandated certain measures to control the disease. In response to the Legislative recognition, facts, and circumstances which indicated the existence of an emergency, CDFA undertook measures to immediately mitigate and prevent damage from Pierce's disease and the glassy-winged sharpshooter.

The PDCP emergency regulations were adopted to implement the mandate to control Pierce's disease and its vectors. They wholly occupied the regulatory field, preempting local regulation. Under the PDCP, localities would need to establish local workplans and otherwise enforce the applicable regulations. CDFA may provide logistical support to local agencies as necessary to carry out the workplan. Local workplans would be submitted for approval by CDFA. Only after approval by CDFA would appropriated funds be released to local agencies for reimbursement for their Pierce's disease and glassy-winged sharpshooter control activities.

## **4.4 PROGRAM IMPLEMENTATION**

A number of agencies and advisory groups are involved in creating and implementing the PDCP at statewide and local levels. A description of the roles and responsibilities of the decision-making agencies and consulting agencies involved in the PDCP is provided below.

### **4.4.1 DECISION-MAKING AGENCIES**

Decision-making authority and responsibility for the PDCP rests with two groups: CDFA and the county agricultural commissioners (or other local public entity designated by each county's Board of Supervisors to implement the program). CDFA is the lead agency for statewide PDCP activities, and is responsible for decisions made and actions taken on a statewide basis. CDFA, with input from the counties, develops protocols and guidelines for survey, inspection, regulatory, treatment, reporting, and other program activities. These guidelines give direction to county cooperators and serve to standardize performance of these tasks throughout the state.

CDFR is the lead agency to:

- Establish a Science Advisory Panel to provide expert scientific program evaluation and advice;
- Establish an advisory task force to prioritize research needs, review and recommend research grants, and advise the Secretary of Food and Agriculture on management and control alternatives;
- Develop protocols for regulatory actions, treatment, and survey;
- Develop and maintain databases;
- Restrict artificial movement of the glassy-winged sharpshooter from other states into California;
- Coordinate intrastate regulatory actions;
- Approve workplans submitted by counties;
- Administer contracts for local assistance and for research;
- Implement biological control programs;
- Provide diagnostic services to identify sharpshooters and Pierce's disease;
- Act as a clearinghouse for information to the public and the press;
- Act as liaison to the federal government and other state agencies; and
- In the event that the local agency does not fulfill its obligations, CDFR may provide any logistical support that CDFR deems necessary to implement the local workplan.

In counties that decided to participate in the emergency program, the County Board of Supervisors has typically designated their county agricultural commissioner or department as the public agency that would implement the program. These agencies would continue to fulfill this role for the proposed PDCP. The responsibility for designating the local agency and adopting the county workplan would remain with each county's Board of Supervisors, which may choose to designate another public agency. For purposes of simplification, this EIR refers to the county agricultural commissioners or the county agricultural department as the designated local public implementation agency. The county agricultural departments are the local agencies for decisions and actions at the local (county) level, with guidance and coordination from CDFR, which has ultimate authority via approval of county workplans. In the event that the local agency does not fulfill its obligations,

CDFA may provide any logistical support that CDFA deems necessary to implement the local workplan.

Each county's Board of Supervisors would:

- Designate the local public implementation agency (usually the county agricultural commissioner or the county agricultural department)
- Adopt the county workplan

Each county's agricultural commissioner or department is the local agency that would:

- Establish local task forces to develop rapid response plans and facilitate outreach coordination<sup>1</sup>, and communication;
- Implement the statewide detection program within their jurisdiction;
- Implement and coordinate local management programs identified in the county workplan;
- Inspect regulated commodities, including nursery stock, and take appropriate action to ensure that regulated businesses only ship commodities that are free of glassy-winged sharpshooter; and
- Ensure pesticide treatments and other control actions are conducted appropriately.

#### **4.4.2 CONSULTING AGENCIES AND GROUPS**

Information may be solicited from other persons or agencies with pertinent information, expertise, or jurisdiction. Some of the established consulting agencies and groups are described below. In addition, local groups and organizations may also be consulted in the development of each county's local programs.

#### **SCIENCE ADVISORY PANEL**

The Glassy-winged Sharpshooter Science Advisory Panel (SAP) consists of University scientists who are experts on the biology and control of Pierce's disease or the glassy-winged sharpshooter.

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<sup>1</sup> Senate Bill 594 creates the Napa County Winegrape Pest and Disease Control District Law. The bill establishes procedures for the formation of an assessment district in Napa County to assist in the funding of the inspection, detection, and education of Pierce's disease, as stated in the Napa County Glassy-winged Sharpshooter Workplan, to prevent the spread of Pierce's disease by the glassy-winged sharpshooter.

These scientists advise the Secretary of CDFA on the biological soundness of program activities, evaluate and interpret program data, and develop recommendations for improving program effectiveness.

### **PIERCE'S DISEASE ADVISORY TASK FORCE**

The Pierce's Disease Advisory Task Force consists of scientific experts, agriculture representatives, representatives from county agricultural departments and environmental groups. It was formed in accordance with section 12798.1 of the Food and Agricultural Code to advise the Secretary of CDFA on the control and management of Pierce's disease. The Task Force also makes recommendations to the Secretary on funding of proposed research projects. Several subcommittees have been formed to assist the Task Force with investigating issues and formulating recommendations. These include subcommittees for research, public outreach, grape movement, citrus, and nursery.

### **PIERCE'S DISEASE AND GLASSY-WINGED SHARPSHOOTER BOARD**

Existing law creates the Pierce's Disease Management Account within the Food and Agriculture Fund for the purpose of research and other efforts to combat Pierce's disease and its vectors. Assembly Bill 1394 established the Pierce's Disease and Glassy-winged Sharpshooter Board and provided for a specified annual assessment to be paid by processors into the Department of Food and Agriculture Fund for the purposes of, among other things, research or integrated pest management and other sustainable industry practices. The Board will be responsible for developing recommendations to the Secretary of Food and Agriculture for expenditure of the funds for the purpose of implementing and continuing the agricultural program for which the assessment is collected.

### **ENVIRONMENTAL PROTECTION TASK FORCE**

The Environmental Protection Task Force was formed in accordance with supplemental budget language from the 2000-01 State Budget Act. The Task Force included representatives from six state agencies, four environmental groups, two grower organizations, the University of California, and the county agricultural commissioners. It was charged with providing, prior to January 1, 2001, input to CDFA concerning the potential adverse effects on public health and the environment from the application of pesticides, and suggesting measures which would reduce possible harm to public health and the environment while effectively managing the Pierce's disease pest threat. The

Task Force met four times in the fall of 2000 and developed three consensus recommendations for CDFA to follow. The report of the Task Force was issued in December 2000. Excerpts from the final report including the Executive Summary are provided as Appendix F.

### **LOCAL GLASSY-WINGED SHARPSHOOTER TASK FORCES**

Local glassy-winged sharpshooter task forces were formed in some counties by the local county agricultural commissioner to serve in an advisory and support role. Members include growers of at-risk commodities, U.C. Cooperative Extension personnel who have pertinent expertise, and others who may have a strong interest in, or who may be significantly affected by, Pierce's disease and the glassy-winged sharpshooter. The task forces advise the Commissioner, help with the development of a local plan, and assist with communication and outreach. By bringing people together, the task forces make the process participatory, informative, and inclusive, so that interested and affected parties are involved and knowledgeable about Pierce's disease and the glassy-winged sharpshooter activities in their area. They also enable each county to be proactive rather than reactive to the local Pierce's disease and glassy-winged sharpshooter situation. The level of formality, expansiveness of membership, and frequency of meetings varies among task forces. These local task forces are entirely voluntary.

### **UNITED STATES DEPARTMENT OF AGRICULTURE**

The United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) has provided funding for survey and inspection activities conducted against the glassy-winged sharpshooter. APHIS has provided oversight of county survey work, carried out in accordance with the Glassy-winged Sharpshooter Survey Guidelines. Additionally, the USDA has contributed funding for research against Pierce's disease and glassy-winged sharpshooter, and is involved in selected research-related efforts. USDA is a funding source for the survey element of the PDCP and provides expertise in pest prevention.

### **FEDERAL RESOURCE AGENCIES AND STATE TRUSTEE AGENCIES**

Federal resource agencies and state trustee agencies include the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), the California Department of Fish and Game (CDFG), the University of California, and other government agencies charged with stewardship and protection of California's natural and publicly-owned resources. These public agencies are contacted and consulted as appropriate when PDCP activities are planned on property

or resources under the control or stewardship of one of these agencies. This would include activities planned in the vicinity of sensitive habitats or the habitat of threatened or endangered species. CDFA's consultation process with the USFWS, CDFG, and NMFS, where applicable, is described in more detail in Section 4.6.4: Rapid Response and Treatment.

### **FEDERAL, STATE, AND COUNTY PESTICIDE REGULATORY AGENCIES**

One of the primary methods available for controlling or eradicating populations of glassy-winged sharpshooters is the application of pesticides. This activity is regulated by federal and state pesticide regulatory agencies. Consequently, CDFA would interact with these agencies to determine what materials and methods of application are available for specific situations encountered during PDCP activities. Additionally, special registrations may be requested by the PDCP when no other effective material is available for a desired use. It is the county agricultural commissioners' responsibility to enforce pesticide regulations in each county.

### **OTHER COOPERATING AND PARTICIPATING AGENCIES**

At times the cooperation and participation of other agencies would be needed during some aspect of the program. For example, assistance from the California Department of Transportation (Caltrans) would be needed when program activities are planned or conducted along highway right-of-ways. Assistance to CDFA from the California Department of Health Services may be needed to address community health concerns during treatment activities. Environmental monitoring during treatment would be conducted by staff of the California Department of Pesticide Regulation (CDPR). Members of the California Conservation Corps would assist with survey and inspection activities. These and other situations involve interacting with staff from other agencies to ensure that their agency's requirements are addressed and the specific activities they would be involved in are properly coordinated with the rest of the program.

## **4.5 LOCAL PDCP WORKPLANS**

CDFA has approved county workplans under the existing emergency program. By law, CDFA cannot allocate funds to local public entities until their workplans are approved. Food and Agricultural Code Section 6046 also creates specific requirements for the content of workplans. These include, but are not limited to, the following:

- The development and delivery of producer outreach information and training to local communities, groups, and individuals to organize their involvement with the workplan and to raise awareness regarding Pierce's disease and its vectors.
- The development and delivery of ongoing training of the designated local public entity's employees in the biology, survey, and treatment of Pierce's disease and its vectors.
- The identification within the designated local public entity of a local Pierce's disease coordinator.
- The proposed treatment of Pierce's disease and its vectors.
- The development and implementation of a data collection system to track and report new infestations of Pierce's disease and its vectors in a manner respectful of property and other rights of those affected.

Prior to approving any workplan, CDFA issues guidelines and templates to county agricultural commissioners or other designated local public entities for them to follow when preparing their workplans. This serves to standardize and simplify the process for the local public entities.

Appendix G is the workplan template for 2001/02.

When submitted to CDFA for approval, county workplans are first reviewed to ensure there are no major omissions, deficiencies, or formatting problems. The local public entity may be asked to correct these before the workplan can continue through the review process. If the workplan is essentially complete, it is forwarded to program staff for a second level review by staff to ensure it is consistent with the statewide program and is programmatically sound and reasonable.

Variations from the standard workplan stipulations may be allowed in some cases. For example, a local public entity may wish to be more restrictive on the entry of nursery stock from infested areas, because the resources it is entrusted to protect are especially vulnerable to impacts from Pierce's disease and its vectors. If variations are present in a submitted workplan, program staff review and evaluate the variations to determine whether they are justified by the evidence provided by the local public entity. If the variations cannot be justified, the local public entity would be asked to revise its workplan accordingly. If variations could cause environmental impacts beyond those evaluated in this EIR, the county requesting the variations would be required to further evaluate its proposed program, consistent with the requirements of CEQA.

## 4.6 PROGRAM COMPONENTS

The PDCP has five central elements: public outreach, statewide survey, contain the spread, local management/rapid response, and research. The PDCP, including these central elements, will be implemented by the activities described in this EIR. The PDCP will also be implemented by the adoption of standards and processes codified in regulations adopted by CDFA, and guided by guidelines and protocols.

### 4.6.1 PUBLIC OUTREACH

The outreach component of the PDCP serves to raise awareness about Pierce's disease and the glassy-winged sharpshooter, notify people of PDCP activities, and address questions and concerns about the program. Among other things, outreach seeks to enlist the help of the public, stakeholders and others in finding new infestations of the glassy-winged sharpshooter. Finding new infestations quickly increases the opportunity to contain and perhaps eradicate them. County agricultural commissioners and local task forces have primary responsibility for targeted public outreach about Pierce's disease, the glassy-winged sharpshooter, and the PDCP. The county agricultural commissioners and the local task forces provide information about glassy-winged sharpshooter biology and detection, regulations that affect product shipment or processing, and treatment options. CDFA provides general information (updates, brochures, reports, research summaries, treatment options, and background material) to county agricultural commissioners and other local government offices. CDFA also provides technical information and technical support and training, assists in the development and dissemination of literature, and acts as a clearinghouse for information to the public and the press.

CDFA maintains a web site to provide information on the PDCP. The CDFA glassy-winged sharpshooter-PDCP web site offers frequent updates on infestation areas, treatment information, upcoming meetings and events, a host list, a chronology of the glassy-winged sharpshooter program, survey and regulation guidelines, biological control measures, resources and links, and other program and technical information. The CDFA web site address is: <http://www.cdfa.ca.gov/phpps/pdcp/>. From the "environmental info" section of the web site users can access a link to the California Department of Pesticide Regulation's (CDPR) glassy-winged sharpshooter project web site, <http://www.cdpr.ca.gov/docs/gwss/>. CDPR monitors pesticide applications conducted as part of the PDCP. The CDPR web site provides reports on CDPR's monitoring efforts to date.

When a new infestation is discovered, CDFA may assist local authorities with the planning and presentation of public meetings; inform the media; provide information and instructive materials for community organizations; and work with local officials to respond to the unique social, environmental, and public health needs of each community.

Prior to any treatment activity in non-agricultural areas, informational meetings would be held to advise residents and other interested parties of planned treatment activities, and to address any questions or concerns. Pre-treatment notification would be conducted through the local news media and by door-to-door notification of infested properties and adjacent properties. Notices would include information regarding the pesticide treatment materials or other treatment methods used, precautions, date of intended applications, and a telephone number and contact for the local (county) PDCP staff.

Additional notification measures would be taken for fragile populations and other shared community spaces. Schools, day care centers, rest homes, and hospitals that are near any proposed pesticide treatment operations would be notified by direct communication to administrators. Schedules would be provided in writing. The notification would describe the area of pesticide application, and would specify whether or not the subject property is directly affected. If these locations require treatment, administrators would be consulted and special scheduling (weekends or off-time hours) of applications arranged, if necessary. Similar scheduling arrangements for parks, recreation areas, malls, large apartment complexes, and other busy public areas would also be provided. Notices of treatment would be posted on trees, benches, traffic medians, common areas, or bulletin boards at affected locations, and additional project staff may be assigned to monitor treated areas in order to alert individuals who may approach the area.

#### **4.6.2 STATEWIDE SURVEY**

The statewide survey element of the program is designed to find and monitor glassy-winged sharpshooter infestations and populations. Statewide surveys would be conducted annually to find and monitor glassy-winged sharpshooter infestations and populations, using systematic visual survey and/or trapping of nurseries, croplands, and non-agricultural areas for glassy-winged sharpshooter. In non-agricultural and cropland areas, detection activities would be conducted from March or April through October of each year. In nurseries, detection activities would be conducted year-round.

The detection program for glassy-winged sharpshooter would follow guidelines prepared and amended as needed by CDFA (See Appendix H). The guidelines outline trapping and visual inspection procedures and protocols. Yellow panel traps have been found useful for glassy-winged sharpshooter detection and have detected the presence of sharpshooters when other survey techniques have failed. Visual inspection also has been useful. Adults, nymphs, nymphal cast skins, egg masses, and egg scars can be found by visually searching plants. Visually searching host plants can be enhanced by using insect nets (aerial and sweep) and beating sheets.

### **4.6.3 CONTAIN THE SPREAD**

The goal of this element of the PDCP is to prevent or slow the spread of the glassy-winged sharpshooter and Pierce's disease by reducing glassy-winged sharpshooter populations through biological and other control measures, and by regulating the movement of nursery stock, citrus, grapes, and other commodities which may harbor the glassy-winged sharpshooter.

### **REGULATORY ACTIVITIES, TREATMENT, AND CONTROL**

CDFA, pursuant to legislative mandates, adopted emergency regulations for nursery stock, bulk grapes and citrus, and coordinated a statewide system for compliance. Enforcement of program regulations would continue under the proposed PDCP. The regulations include the standards, certification requirements, and exemptions for the movement of bulk grapes, bulk citrus, and nursery stock from glassy-winged sharpshooter infested areas to non-infested areas. The purpose of the regulations is to prevent the spread of the glassy-winged sharpshooter to new areas of the state. This is achieved by regulating shipments of host plants and plant materials. Any grape grower, citrus grower, or nursery located in a glassy-winged sharpshooter infested area planning to ship bulk grapes, citrus or nursery stock to noninfested areas would be required to comply with the glassy-winged sharpshooter control regulations. Shipping protocols for nurseries to comply with these regulations are provided in Appendix I. Standards for the movement of bulk grapes, plants, and bulk citrus are described in the plant quarantine manual sections provided in Appendix D.

California has approximately 9,000 licensed nurseries. About 60% of the State's nurseries are located in counties that are generally infested with glassy-winged sharpshooter, and many of those ship to uninfested areas. Many of the state's grape growers sell their harvest to grape processors (i.e., wineries, juice manufacturers) located considerable distances from the production vineyards. Citrus plants have been identified as a primary feeding plant for the glassy-winged sharpshooter.

At harvest, the insects fall into picking bags and ultimately end up at processing facilities in other parts of the state.

Activities to reduce the risk of spreading glassy-winged sharpshooter through shipments include: 1) of nursery stock, bulk grapes, and citrus from infested areas prior to shipping to non-infested areas; 2) treatment of the shipments with registered pesticides or other methods suitable for leafhopper control when necessary; 3) certification of shipments; and 4) notification of shipment receivers to hold shipments for inspection prior to sale.

Under the regulations, the agricultural commissioner in the county where a shipment originates would enter into compliance agreements with growers in the county and issue certification tags when prescribed conditions are met. Standards would allow for inspection at origin, with certification of glassy-winged sharpshooter-free shipments based on visual survey, trapping, inspection, or approved pesticide treatment. Color-coded compliance certification tags may accompany each load of bulk grapes and citrus, and would be collected by the receiver. At the final destination, the receiving county would inspect shipments again for glassy-winged sharpshooters. If any viable glassy-winged sharpshooter life stages are discovered, the receiving county may allow the treatment of a shipment or reject all or part of the shipment, and elect to have it destroyed or returned. Regulations also may cover other commodities found to present a risk of moving the glassy-winged sharpshooter.

Grape growers, citrus growers and nurseries may use pesticide treatments to meet shipment protocols. Growers and nursery owners may use any registered pesticide suitable for leafhopper control. The criteria for pesticide selection by an individual grower or nursery would depend on their specific circumstances of harvest, worker re-entry, and/or shipment. Pesticides would be used according to U.S. EPA and California EPA registration and label directions.

### **BIOLOGICAL CONTROL PROGRAM**

The goal of the biological control program is to reduce glassy-winged sharpshooter populations using natural enemies of the pest. It is anticipated that release of natural enemies of the sharpshooter will help reduce the need for other control measures.

As discussed in Chapter 3, the glassy-winged sharpshooter is native to the southeastern U.S. and northeastern Mexico, where natural enemies reduce sharpshooter populations. In California, the

most effective natural enemy appears to be a tiny stingless parasitic wasp, *Gonatocerus ashmeadi*, which parasitizes sharpshooter eggs. Although this stingless wasp readily attacks the sharpshooter eggs in late summer, it is unable to prevent outbreaks of glassy-winged sharpshooters in the late spring and early summer. For this reason, CDFA is evaluating a suite of introduced and native natural enemies to increase the chances for effective biological control over a broader range of host plants, seasons, and climatic zones. CDFA has developed partnerships with USDA, the University of California, and county agricultural commissioners to target research efforts to find, rear, and release natural enemies of the glassy-winged sharpshooter.

The biological control program includes an ongoing search in the southeastern U.S., northern Mexico, and South America to find new natural enemies that would be effective against the glassy-winged sharpshooter. Table 4-1 is a partial list of glassy-winged sharpshooter natural enemies and their native locations.

These natural enemies are being evaluated under the emergency program for importation and release in California to reduce populations of glassy-winged sharpshooter. For the proposed PDCP, CDFA would evaluate the success of these rearing activities and trial releases to determine if these biological control agents could effectively control glassy-winged sharpshooter populations statewide. A description of the regulatory evaluation process for importing new biological control agents is provided below, along with a description of rearing operations and trial releases conducted under the emergency program. These activities are proposed to continue with the proposed PDCP.

TABLE 4-1. GLASSY-WINGED SHARPSHOOTER NATURAL ENEMIES

GWSS Egg Parasitoids	Location	Additional Known Sharpshooter Hosts
<b>Mymaridae (Fairy Fly Wasps)</b>		
<i>Acmapolynema sema</i>	Georgia	<i>Homalodisca insolita</i>
<i>Gonatocerus ashmeadi</i>	North Carolina south to Florida and West to California, Mexico, Venezuela, perhaps Central America	<i>Cuerna costalis</i> , <i>Homalodisca lacerta</i> , <i>Oncometopia orcona</i> , and <i>O. clarior</i>
<i>Gonatocerus fasciatus</i>	Illinois south to Florida and West to Texas.	The glassy-winged sharpshooter is the only known host of this wasp in Georgia and Louisiana although it must parasitize another host in Illinois and other states where the glassy-winged sharpshooter is not present.
<i>Gonatocerus incomptus</i>	California and Georgia	<i>Cuerna costalis</i> in Georgia and <i>Homalodisca lacerta</i> in southern California.
<i>Gonatocerus morrilli</i>	Georgia to Florida and West to California, perhaps Central Americas.	<i>Oncometopia nr. nigricans</i> and <i>O. clarior</i> .
<i>Gonatocerus novifasciatus</i>	Nova Scotia south to Florida and West to Montana and California, perhaps also in Central America.	<i>Homalodisca lacerta</i> in California and <i>Graphocephala</i> spp. in Georgia.
<i>Gonatocerus triguttatus</i>	Texas, Mexico, perhaps Central America (introduced to California under the emergency program)	<i>Paraulacizes thunbergi</i> , <i>Oncometopia orvona</i> , and other <i>Oncometopia</i> spp.
<b>Trichogrammatidae (Trichogrammatid Wasps)</b>		
Unidentified species of <i>Ufens</i>	Eastern US, Mexico, and California	<i>Oncometopia clarior</i> and <i>H. lacerta</i> . <i>Ufens</i> will only develop on certain species of plants
<i>Zagella</i> sp.	Georgia and Florida	

Note: Common names are not available for the species listed in this table.

Source: CDFA 2001g.

### **Biological Control Agent Evaluation Process Prior to Release in California**

Potential non-native biological control agents found outside of California must be evaluated by USDA and CDFA prior to introduction into the State. The USDA Animal and Plant Health Inspection Service (APHIS) has authority to regulate the movement of plant pests into the U.S. and within the U.S. if they cross state boundaries. California has authority to regulate the importation and release of insects and other pests under the Food and Agricultural Code (Section 6305). CDFA has developed guidelines to evaluate whether to permit the importation and/or release of a biological control agent in the state (Appendix J). The guidelines are designed to encourage the appropriate use of such agents in California. The guidelines are also designed to provide a review of the potential benefits of the introduction of biological control agents into the state, an estimation

of the likelihood of success, potential undesirable effects of the agents, and the likelihood of their occurrence. An important phase in assessing the suitability of a new biological control agent is determining whether it would adversely impact other organisms, such as native insects. The guidelines recommend that possible benefits and undesirable consequences be evaluated before CDFA makes a decision on whether to continue. Allowing importation for study does not mean that an organism would be approved for release.

### **Trial Releases of Biological Control Agents**

Currently under the emergency program there are three non-native natural enemies that are permitted for field release and that show promise for permanent establishment. The tiny stingless wasp, *Gonatocerus ashmeadi* (ex. ["from"] Mexico), was recently collected in northern Mexico and is available for release. Two other stingless wasps, *Gonatocerus triguttatus* (ex. Mexico) and *Gonatocerus morrilli* (ex. Mexico), were recently reared from glassy-winged sharpshooter eggs collected in central and northeastern Mexico. Trial releases of *Gonatocerus ashmeadi* (ex. Mexico), *Gonatocerus triguttatus* (ex. Mexico), and *Gonatocerus morrilli* (ex. Mexico) are underway in central and southern California. These trial releases are conducted for research purposes. Scientists from UC and CDFA are monitoring these release sites to determine if the agents survive and have an impact on glassy-winged sharpshooter populations. The location of natural enemy trial release sites is shown in Figure 4-2. Several other imported glassy-winged sharpshooter natural enemies are in quarantine, undergoing evaluation before being considered for release in California.

Prior to the importation and release of these wasps, CDFA examined the available data according to the biological control agent evaluation guidelines (Appendix J), and determined that the permit (Appendix K) requesting permission to import and release these glassy-winged sharpshooter natural enemies should be approved. Through the evaluation process, CDFA made the following conclusions:

- The natural enemies proposed for introduction attack the egg masses of the glassy-winged sharpshooter.
- The primary goal of the introduction of non-native natural enemies is to increase the rate of parasitization of the egg masses of the first glassy-winged sharpshooter generation.
- It is very likely that any natural enemy introduced would also attack the egg masses of the second glassy-winged sharpshooter generation.

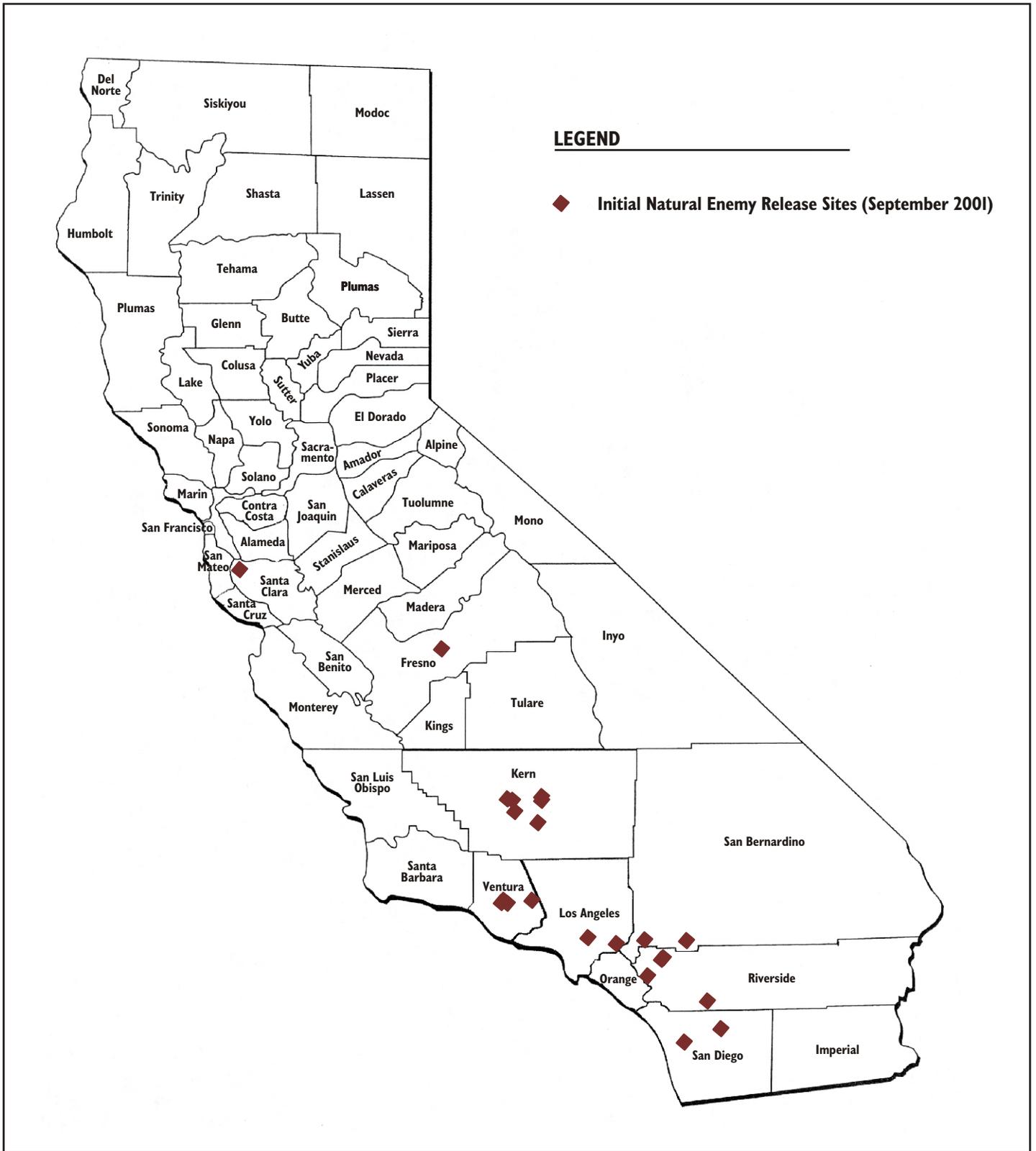
- It was reasonable to assume that the additional mortality imposed by these natural enemies on native sharpshooters would lower their numbers, but this is not a certainty.
- It was considered likely that the natural enemies proposed for introduction would also attack the egg masses of the smoketree sharpshooter and other native sharpshooters that are vectors of Pierce's disease.
- No native leafhopper is considered a threatened or endangered species, or a species of concern.
- The natural enemies that attack leafhopper egg masses are not known to attack the eggs of other taxa of insects.

All future permit requests for the importation of natural enemies of the glassy-winged sharpshooter would be subjected to a similar review by CDFA. USDA has noted that natural enemies of insects are not considered plant pests and thus are not subject to regulation under their authority.

If the natural enemy trial releases show effective control of the glassy-winged sharpshooter, CDFA would release the natural enemies into a large number of locations throughout the entire distribution of the glassy-winged sharpshooter. New natural enemies must be released in an environment that would support their survival, so prior to release, CDFA would evaluate sites throughout infested areas of the state in order to find optimal habitat for natural enemies. After new natural enemies are released in the field, their impact on sharpshooter populations would be measured carefully to determine if the new natural enemy significantly reduced the pest population.

To increase the chances that a new natural enemy would become established and have an impact on the glassy-winged sharpshooter statewide, large numbers of the new insect must be reared and released. Staff members from UC Riverside and CDFA have developed a rearing protocol for the sharpshooter and associated natural enemies. CDFA has also contracted with a private insectary to supplement rearing operations. Two insect-rearing operations have started producing natural enemies for the control of the glassy-winged sharpshooter. The rearing operations are not yet fully operational.

CDFA is committed to exploring the use of biological control in the PDCP. However, it is limited by the ability to rear natural enemies. The process for rearing sharpshooter natural enemies is complex. Host plants must be raised to serve as food for a colony of sharpshooters. The eggs produced by these lab-reared sharpshooters are then used to rear the natural enemies.



Source: CDFA, September 2001

**Figure 4-2 : Initial Natural Enemy Trial Release Sites Under the Emergency Program**  
 Pierce's Disease Control Program EIR





The reason why CDFA has not been able to produce great quantities of glassy-winged sharpshooter natural enemies under the emergency program is because of low egg production. As more staff are hired and trained, and as laboratory facilities are completed, an active research program would be conducted to learn how to consistently produce large numbers of eggs.

Initial biological control releases would be in generally infested areas that are unlikely to be treated with pesticides. CDFA would blend targeting sites of special concern (nurseries, citrus orchards with integrated pest management programs), with attempts to distribute the natural enemies to different geographic areas. The initial releases would be small-scale inoculative releases until CDFA is able to produce large quantities of the natural enemies. If the natural enemies become well established and prove to be very effective on their own, CDFA would evaluate the need to continue with releases. CDFA would likely continue to ramp up production and conduct repeated, inundative releases of natural enemies to keep field populations artificially higher than if ambient populations were just allowed to sustain themselves. The PDCP biological control program effort would be influenced by CDFA's ability to rear large numbers of natural enemies and the success in the field. If CDFA determines that effective glassy-winged sharpshooter control is achievable without continuing releases, or that ongoing releases are yielding no benefit, then CDFA would reconsider the utility of this control approach.

#### **4.6.4 RAPID RESPONSE AND TREATMENT**

When a viable (live) specimen of glassy-winged sharpshooter (adult, nymph, or egg mass) is discovered in a new location, the county agricultural commissioner would act quickly to minimize the spread of glassy-winged sharpshooters in the county. Typically, this involves the use of pesticides. The county agricultural commissioner would usually act as the implementation agency for all response activities. The state requires each county to prepare a rapid response plan as part of its county PDCP workplan, should the insect be found. These plans are approved by CDFA. Specimens found in nurseries or shipments of bulk grapes or citrus would not necessarily trigger rapid response and treatment if the specimens are restricted to an incoming shipment.

#### **DELIMITATION SURVEY**

Immediately following the discovery of one or more life stages of a glassy-winged sharpshooter not associated with a recent shipment of regulated products, the county agricultural commissioner

would conduct a delimitation survey to determine the presence and extent of the possible infestation.

A delimitation survey is an intensive, property-by-property visual survey where all properties with host material are inspected for the presence of the glassy-winged sharpshooter. The purpose is to determine if there are more glassy-winged sharpshooters present in the area. The delimitation survey area is all properties within ¼ mile of a glassy-winged sharpshooter find, with each new infested property serving as the center of another area with a ¼ mile radius.

### **CDFA CONSULTATION WITH USFWS, CDFG, AND NMFS**

A glassy-winged sharpshooter infestation is defined by the following criteria: five or more adults within any five day period within a 300 yard radius of each other, or the presence of multiple life stages (e.g., adults, nymphs, and eggs). If a new glassy-winged sharpshooter infestation is found outside of a nursery or shipment situation, and treatment is planned, CDFA, in conjunction with the county agricultural commissioner, would notify the California Department of Fish and Game (CDFG), the U.S. Fish and Wildlife Service (USFWS), and, where applicable, the National Marine Fisheries Service (NMFS). A communication process has been put into place that keeps these agencies aware of pest outbreaks and planned treatments. This provides the earliest possible notice to these agencies that the area may be included in a PDCP pesticide treatment area.

CDFA has Memoranda of Understanding (MOUs) with both the CDFG and USFWS outlining a communication process for notification of pest control activities and the development of measures to avoid adverse environmental impacts. Copies of the MOU letters are provided in Appendix L. When a new glassy-winged sharpshooter infestation is discovered and the decision is made to treat, CDFA in conjunction with the county agricultural commissioner would provide CDFG and USFWS with maps showing the proposed treatment areas and identifying the pesticides to be used. CDFA would consult the California Natural Diversity Database (CNDDDB) for endangered, threatened or species of concern previously reported inside or in close proximity to the treatment area boundaries and report the results to CDFG and USFWS. If, using this information, CDFG and USFWS conclude that the proposed PDCP activities pose a “potential jeopardy” to threatened, endangered, or species of concern, then the agencies would develop appropriate measures to avoid jeopardy in these sensitive areas.

The MOUs between CDFA and CDFG and USFWS provide a channel for communication between these two organizations and CDFA concerning threatened and endangered species, other species of special concern, and sensitive habitats. CDFA has altered its pest eradication protocols in the past to accommodate requests from CDFG and USFWS concerning listed threatened and endangered species and non-listed species and habitats of concern to these organizations. CDFA will continue to work with both CDFG and USFWS to avoid “take” of threatened and endangered species and to minimize adverse environmental impacts to species of concern and sensitive habitats.

Although CDFA does not have a MOU with NMFS, the format of the coordination program with NMFS is based upon the MOUs signed with the CDFG and USFWS to address control programs for non-native pest outbreaks. CDFA has an informal arrangement with NMFS to discuss activities with them whenever they might impact marine mammals, ocean coastlines, or streams that empty into the ocean. In a consultation letter dated March 26, 2001 to the U.S. Department of Agriculture (USDA) (Appendix N), NMFS concluded that the PDCP is not likely to adversely affect salmonids or their designated critical habitat protected by the Endangered Species Act, and Essential Fish Habitat is not likely to be adversely affected.

The presence of threatened or endangered species or sensitive habitat may require that treatment regimes be altered so that take of the species, or adverse modification of sensitive habitat, does not occur. Treatment plans are designed to insure that “take” of threatened or endangered species would not occur. This could mean that a section of riparian area is only treated partially (e.g. no insecticides sprayed on trees above a certain height level to ensure that there is not any drift into the associated water body) or not treated at all. Specific measures tailored to avoid impacts to threatened and endangered species in proposed treatment areas would be developed through the communication process described in the MOUs.

CDFA has used the process described in the MOUs to consult with CDFG and USFWS about potential impacts of the activities undertaken during the emergency program (Appendix O). No impacts have been identified from emergency program activities to date on either threatened or endangered species, species of special concern, migratory birds, or sensitive habitat. Should new glassy-winged sharpshooter infested sites be discovered in California, CDFA would consult with CDFG, USFWS, and NMFS, as needed.

## TREATMENT OF INFESTED PROPERTIES

Once a new glassy-winged sharpshooter infestation is found and delimited, and appropriate federal and state agencies have been consulted, the county agricultural commissioner would coordinate the treatment of infested properties, in accordance with previously approved protocols and the CDFA-approved county workplan. Typically this involves the use of pesticides as described in more detail below. Vegetation that serves as a potential host may be removed under specific circumstances as part of the PDCP. Host removal could occur on unmaintained cropland such as an abandoned vineyard or orchard, from along roadsides, and elsewhere when the vegetation is helping support a glassy-winged sharpshooter infestation, and is affecting nearby viable crops. Special-status plants or vegetation associated with sensitive habitats would not be disturbed.

As identified in Chapter 3, the glassy-winged sharpshooter is well established in Southern California. For this reason, the goal of local programs in generally infested counties is containment, rather than eradication. County agricultural commissioners in these areas would continue to conduct public outreach, survey, contain the spread, and research activities, but rapid response activities would be limited. County agricultural commissioners may coordinate vegetation host removal on abandoned cropland or roadsides if the vegetation is supporting a glassy-winged sharpshooter infestation that is affecting nearby cropland, or is serving as a source of the *Xylella fastidiosa* bacteria. At their own discretion, growers may choose to apply pesticides to control glassy-winged sharpshooters on their property. This would not be considered part of the PDCP. By law, growers must comply with pesticide label restrictions.

In Northern California, the glassy-winged sharpshooter has been detected in several counties, but has not yet become generally established. For this reason, local treatment programs generally strive for local eradication of the glassy-winged sharpshooter, to prevent its permanent establishment in the area. In these areas, the PDCP includes provisions for application of chemical pesticides in non-agricultural areas. Vegetation host removal could also occur. Chemical pesticides may be applied by ground treatment (i.e., by personnel on the ground) to non-agricultural properties harboring the glassy-winged sharpshooter. Aerial treatment of residential and urban areas for control of the glassy-winged sharpshooter is not included in the PDCP. A description of proposed treatment activities is provided in more detail later in this section.

The methods chosen to treat each infested area would depend on various factors including location, size of the infestation, presence of threatened or endangered species, likelihood of success, etc.

Figure 4-3 presents the decision process for choosing an effective method for controlling the glassy-winged sharpshooter.

### **Pesticide Selection and Use**

Registered pesticides approved by the U.S. EPA and CDPR for residential and landscape use would be used in residential and landscape areas for treatment of new infestations outside the generally infested areas. Pesticide treatment may be either foliar (i.e. applied to the leaves of host plants), or applied to the soil under host plants for uptake by the root system and into the circulatory system of the plant.

Materials that have been used under the emergency program include carbaryl (Sevin ["7"]®) and cyfluthrin (Tempo®) as foliar sprays (i.e., material sprayed on plant foliage), and imidacloprid (Merit®) as a foliar spray or applied as a soil drench or soil injection. (The trade name of the pesticide used in the emergency program is in parenthesis following the active ingredient.) These pesticides would most likely continue to be used as the primary pesticides for the rapid response program. However, other pesticides registered for use against leafhoppers may be applied under the direction of county agricultural commissioners and departments if information suggests an advantage exists or other benefit (e.g., reduced risk). General information about Sevin ("7")®, Tempo®, and Merit®, including the U.S. EPA registration number, dosage, and use restrictions as directed by the product label is provided in Tables 4-2, 4-3, 4-4 and 4-5. Product labels are provided in Appendix M, and an evaluation of the active ingredients in these products is provided in Appendix P.

Additional materials to control the glassy-winged sharpshooter or Pierce's disease, if any become available, may be selected for use in the PDCP as new information about effectiveness emerges from ongoing research and evaluations. By law, the use of these materials would have to comply with all regulatory requirements, including satisfactory toxicity evaluations with reasonable assurance of no harm under proposed use conditions.

Appendix P presents an evaluation of the active ingredients contained in the materials cited above, as well as a discussion of inert ingredients. The discussions are focused on the materials as they may be used in the PDCP, and are not intended to be comprehensive reviews on hazards that may be associated with other applications. The descriptions of these pesticides are based on evaluations completed by the U.S. EPA and CDPR.

FIGURE 4-3: DECISION PROCESS FOR PESTICIDE TREATMENT RESPONSE

- 1. Was the glassy-winged sharpshooter found in association with a shipment of a regulated commodity (nursery stock, bulk grapes, citrus, etc.)**
  - Yes → Return, destroy or treat shipment; if appropriate, intensify survey around shipping destination area.
  - No → Increase survey to delimitation levels; go to 2.
- 2. Was the glassy-winged sharpshooter infestation found and treated in a previous year?**
  - Yes → Delimit remaining population and treat with the most effective material to eliminate or control the population, according to established protocols.
  - No → Go to 3.
- 3. Were five or more adult glassy-winged sharpshooters within a radius of 300-yards within a five-day period, or multiple life stages, detected at a given time?**
  - Yes → Infestation found in an agricultural setting (go to 4).  
Infestation found in an urban/residential setting (go to 6).  
Infestation found in a natural or uncultivated setting (go to 7).
  - No → Return to detection level survey effort.
- 4. Is elimination of the infestation feasible? (Primary consideration is the size, location and characteristics of the infested area.)**
  - Yes → a. Conventional farming operation: Use any effective insecticide registered for use on the involved crop.  
b. Organic farming operation: Attempt organic methods and go to 5.
  - No → Consider area-wide treatment program to reduce impacts from pest.
- 5. Did organic methods eliminate the glassy-winged sharpshooter population?**
  - Yes → Consider organic control options for use in other treatment areas.
  - No → Use conventional methods to eliminate pest.
- 6. Is elimination of infestation feasible? (Primary consideration is given to the size, location and characteristics of the infestation.)**
  - Yes → Select from recommended treatment options for urban/residential areas; apply according to protocol.
  - No → Consider treatment options to slow the spread of pest to agricultural areas.
- 7. Is elimination of the infestation feasible? (Primary consideration is given to the size, location and characteristics of the infestation.)**
  - Yes → Working with appropriate agencies, select the most effective treatment option to eliminate the pest while mitigating potential significant environmental impacts.
  - No → Working with appropriate agencies, develop a program that will slow the spread of the pest without significant environmental impacts.

**TABLE 4-2: "SEVIN '7'®" CARBARYL INSECTICIDE**

<b>Product Information<sup>a</sup></b>	
Registration Number	54705-4
CDPR Product Registration Date	August 20, 1997
Active Ingredient	Carbaryl
% Active Ingredient	41.2%
Dosage	1-4 tsp. per gallon of water
Registered Uses	Registered on many fruits, vegetables, trees, and ornamental plants
<b>PDCP Program Use<sup>b</sup></b>	
Method of Application	Foliar spray
PDCP Frequency & Timing of Applications	Usually two treatments per season, after egg hatch, when most sharpshooters are in the nymphal stage, prior to egg-laying by adults.

<sup>a</sup> Source: *Sevin ("7")®* product label

<sup>b</sup> Source: *CDF*

**TABLE 4-3: "TEMPO® 20 WP" CYFLUTHRIN INSECTICIDE**

<b>Product Information<sup>a</sup></b>	
Registration Number	3125-380
CDPR Product Registration Date	January 19, 1989
Active Ingredient	Cyfluthrin
% Active Ingredient	20%
Dosage	5 grams of Tempo 20 WP per 1000 sq. ft.; mixed in sufficient water to adequately cover the area being treated, but which will not allow dripping or run-off to occur.
Registered Uses	Registered for use on indoor and outdoor foliage.
<b>PDCP Program Use<sup>b</sup></b>	
Method of Application	Foliar spray
PDCP Frequency & Timing of Applications	Usually two treatments per season, after egg hatch, when most sharpshooters are in the nymphal stage, prior to egg-laying by adults. May be applied as a tank mix with imidacloprid.

<sup>a</sup> Source: *Tempo® 20 WP* product label

<sup>b</sup> Source: *CDF*

TABLE 4-4: "MERIT® 75 WSP" IMIDACLOPRID INSECTICIDE

<b>Product Information<sup>a</sup></b>	
Registration Number	3125-439
CDPR Product Registration Date	December 6, 1994
Active Ingredient	Imidacloprid
% Active Ingredient	75%
Dosage	Foliar sprays (ornamentals): 1.6 oz. of product per 300 gallons of water. Soil drenches/injections (ornamentals): 1.6 oz. of product per 24-48 cumulative inches of tree trunk diameter, or per 24-48 cumulative feet of shrub height.
Registered Uses	For foliar and systemic insect control in turfgrass, landscape ornamentals, fruit and nut trees, and interior plantscapes.
<b>PDCP Program Use<sup>b</sup></b>	
Method of Application	Foliar spray or soil drench/injection
PDCP Frequency & Timing of Applications	<u>Foliar spray</u> : Usually two treatments per season, after egg hatch, when most sharpshooters are in the nymphal stage, prior to egg-laying by adults. May be applied as a tank mix with cyfluthrin or other materials. <u>Soil drench/injection</u> : Usually one treatment per season, timed with the "leaf flush" of plants, or as soon as practicable following discovery of a new infestation.

<sup>a</sup> Source: Merit® 75 WSP product label

<sup>b</sup> Source: CDFA

TABLE 4-5: "MERIT® 75 WP" IMIDACLOPRID INSECTICIDE

<b>Product Information<sup>a</sup></b>	
Registration Number	3125-421
CDPR Product Registration Date	February 7, 1995
Active Ingredient	Imidacloprid
% Active Ingredient	75%
Dosage	Foliar sprays (ornamentals): 10 tablespoons of product per 300 gallons of water. Soil drenches/injections (ornamentals): 1-2 oz. of product per 30 cumulative inches of tree trunk diameter, or per 30 cumulative feet of shrub height.
Registered Uses	For foliar and systemic insect control in turfgrass, landscape ornamentals, and interior plantscapes.
<b>PDCP Program Use<sup>b</sup></b>	
Method of Application	Foliar spray or soil drench/injection
PDCP Frequency & Timing of Applications	<u>Foliar spray</u> : Usually two treatments per season, after egg hatch, when most sharpshooters are in the nymphal stage, prior to egg-laying by adults. May be applied as a tank mix with cyfluthrin or other materials. <u>Soil drench/injection</u> : Usually one treatment per season, timed with the "leaf flush" of plants, or as soon as practicable following discovery of a new infestation.

<sup>a</sup> Source: Merit® 75 WP product label

<sup>b</sup> Source: CDFA

Foliar treatments are generally timed to treat a glassy-winged sharpshooter population after egg hatch, when most of the sharpshooters are in the nymphal stage, prior to egg-laying by adults. Preliminary data suggest that foliar treatments using the materials listed above may have a residual activity of up to six weeks.

Systemic treatments are usually applied early in the season timed with the “leaf flush” of plants to ensure adequate absorption of the material, or as soon as practicable following the discovery of a new infestation.

The following sections describe why carbaryl was initially selected for use in treating infestations in non-agricultural areas under the emergency rapid response program, and identifies the selection criteria used by CDFA to approve materials for incorporation into the treatment program.

#### **Initial Decision to Use Carbaryl in the Non-Agricultural Rapid Response Program**

On June 1, 2000, CDFA convened a conference call of its Glassy-winged Sharpshooter Science Advisory Panel to discuss the newly-discovered glassy-winged sharpshooter infestation in Porterville, Tulare County. The Panel was apprised of the situation in Porterville. In earlier discussions, the Panel members had reviewed treatment options for the sharpshooter and concurred that chemical insecticides were currently the only known effective control options for the pest. In light of the urgent need to slow the spread of the pest, panel members concurred that a rapid response consisting of a treatment program using chemical pesticides was needed. When asked by CDFA to identify insecticides that were known or were believed to be effective against the glassy-winged sharpshooter, Panel members noted that most organophosphate, carbamate, and pyrethroid insecticides should work. Specific materials mentioned were chlorpyrifos, cyfluthrin, and carbaryl.

Recognizing the need for immediate action against the pest, CDFA staff evaluated the recommendations of the Science Advisory Panel, using the following criteria:

- Was the material likely or known to be effective against the glassy-winged sharpshooter?
- Was it registered for use in non-agricultural/residential settings in California?
- Was it registered for use on the broad range of ornamental and food plants likely to be encountered in non-agricultural/residential settings in California?
- Did CDFA have any field experience with the material from past pest prevention projects?

- Was the material readily available in the amounts necessary to treat a large non-agricultural area?

Based on these criteria, CDFA selected carbaryl for use in Porterville. The key factors in the decision included the following:

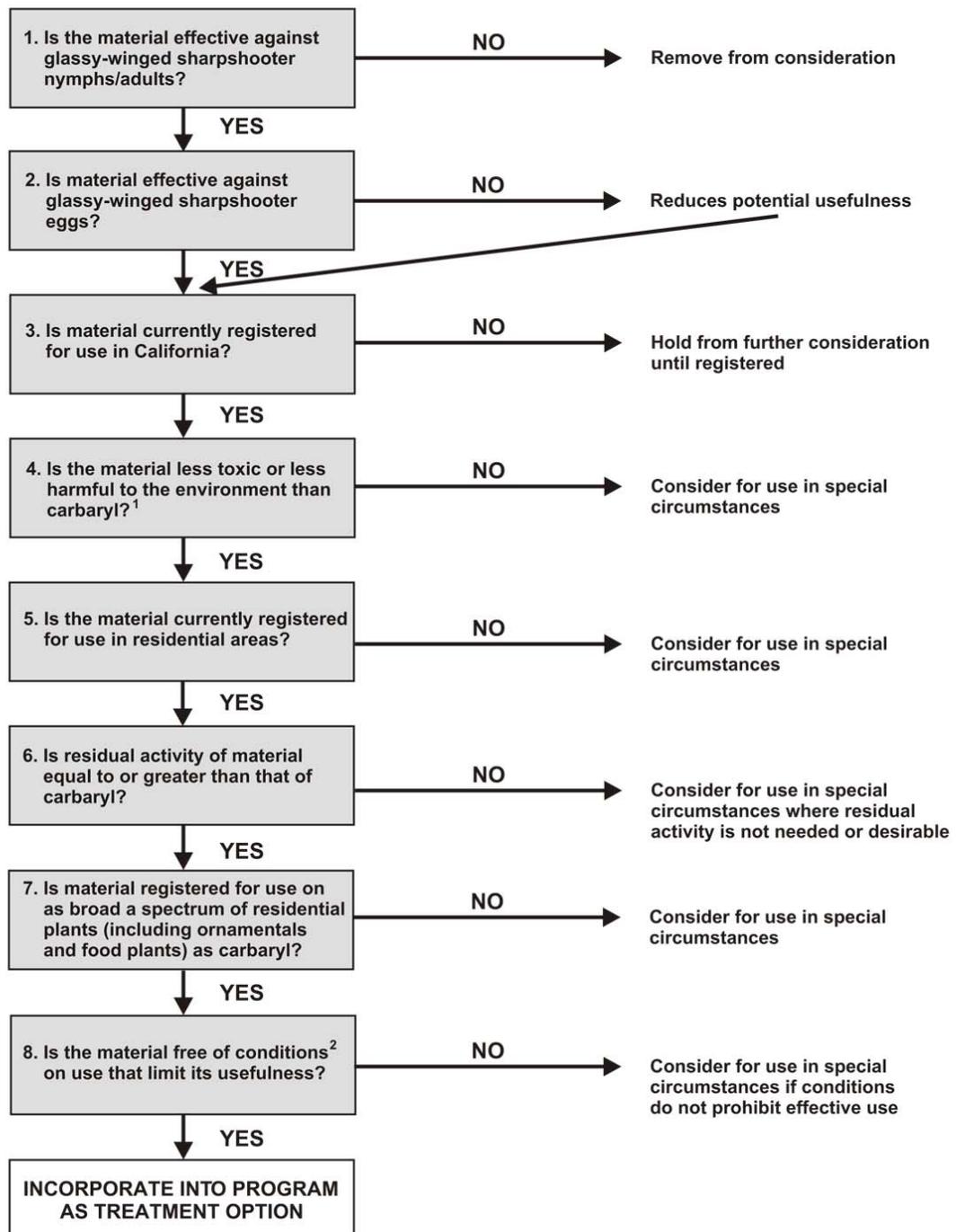
- Carbaryl had been recommended by the Science Advisory Panel.
- Carbaryl was registered for use in non-agricultural/residential settings in California.
- Carbaryl had the greatest breadth of ornamental and food crop uses on its label.
- CDFA had used carbaryl in a similar manner for a Japanese beetle program and clearly understood operational limitations on its use (such as the potential for phytotoxicity on plants if applied when air temperatures are too hot).
- The toxicological and environmental aspects of foliar applications of carbaryl had been reviewed in an Environmental Impact Report produced by CDFA for its gypsy moth eradication program (CDFA 1992)
- Carbaryl was readily available in sufficient quantities.

### **Selection Criteria for Pesticides for Use in the Program**

Because carbaryl was the first material used in the emergency program, it has become the “benchmark” against which all other materials are compared for inclusion into the non-agricultural portion of the program. Figure 4-4 contains a flowchart outlining CDFA's treatment selection process. CDFA has reviewed a large number of insecticides registered for use in non-agricultural settings in California for their potential use in the program (Appendix Q). Although much information--especially about effectiveness against glassy-winged sharpshooters--is lacking, the data are sufficient to determine which products merit further review. A number of materials were eliminated from further consideration, as discussed in Appendix Q.

Those eliminated from further consideration either lack efficacy against the glassy-winged sharpshooter, have operational limitations that render them ineffective or inappropriate for use in this program, or do not meet the criteria of having a better toxicity and health/environmental risk profile than the benchmark, carbaryl.

FIGURE 4-4: CDFA TREATMENT SELECTION PROCESS



<sup>1</sup> Include considerations of: human, vertebrate, and non-target arthropod toxicity; potential ground water contamination; secondary pest outbreak potential; phytotoxicity, etc.

<sup>2</sup> Includes: burning of treated plants if applied when temperatures exceed those listed on label, may not be applied to food crops, must be applied only by licensed applicators, etc.

Table 4-6 identifies pesticide active ingredients that so far have passed CDFA's treatment selection process and might be used in non-agricultural settings in the PDCP.

**TABLE 4-6: PESTICIDES AVAILABLE FOR USE IN NON-AGRICULTURAL AREAS AGAINST THE GLASSY-WINGED SHARPSHOOTER**

Active Ingredient		
Allethrin	Diatomaceous earth	Potash soap
<i>Beauveria bassiana</i>	Dimilin	Pyrethrin
Bifenthrin	Esfenvalerate	Pyrethrin and PBO
Carbaryl	Fenoxycarb	Resmethrin
Cinnamaldehyde	Fenpropathrin	Tau-fluvalinate
Cyfluthrin	Imidacloprid	Tebufenozide
Lamda cyhalothren	Kinoprene	Tetramethrin
Cypermethrin	Malathion	Thiamethoxam
Cyromazine	Permethrin	Tralomethrin
Deltamethrin	Phenothrin	Triforine

Source: CDFA 2001 (Appendix Q).

## TREATMENTS IN AREAS OUTSIDE THE GENERALLY INFESTED AREAS

In areas where glassy-winged sharpshooter infestations are limited and the goal of the local program is suppression or eradication of the glassy-winged sharpshooter, county agricultural commissioners may require growers to treat their crops with registered pesticides suitable for leafhopper control. Growers/owners may apply treatments through ground-based foliar spraying, or soil drenches, or aerial spraying. These treatments are standard agricultural practice and are the responsibility of the farm operator. All appropriate precautions, as specified on the product label, would be taken by applicators. Pesticides would be used according to registration and label directions. Nurseries may be required to hold shipments until all host material within the nursery is treated by the nursery with a properly registered pesticide to control the glassy-winged sharpshooter, as specified by PDCP shipment regulations or protocols. The primary result of any mandate to commercial growers and nurserymen to treat for glassy-winged sharpshooter is a possible increase in the use of some pesticides at an economic cost to the grower.

CDFA is evaluating the efficacy of control methods suitable for organic growers. Several different approaches have been tried, including trial releases of biological control agents and use of organic-approved pesticides. In general these approaches have not proven to be as effective at controlling the glassy-winged sharpshooter and therefore are not recommended. (See Chapter 8 for a more

detailed discussion of the efficacy of alternate control methods.) The decision to use non-conventional pesticide approaches in the PDCP would be made on a case-by-case basis by CDFA and the county agricultural commissioner. The use of organic-approved pesticide approaches to control the glassy-winged sharpshooter would continue to be explored by CDFA.

In locations outside generally infested areas, the PDCP also includes provisions for application of pesticides in non-agricultural areas. It may be necessary to apply pesticides to non-agricultural properties harboring the glassy-winged sharpshooter to keep it from spreading. In areas outside of the generally infested areas of the state, CDFA recommends treatment of properties up to 300 yards away from any known infested property to ensure all infested properties are treated.

When a glassy-winged sharpshooter infestation in non-agricultural areas is detected where the local goal is eradication or suppression, the county agricultural commissioner would coordinate and oversee the treatment program, according to the county's PDCP workplan. The authority for mandating such treatments is set out in the California Food and Agricultural Code, Section 5401 et seq., and is described in Section 4.3.

Biological control of the glassy-winged sharpshooter may be a preferred "treatment" option. As described in Section 4.6.3, current efforts of the biological control program focus on establishing rearing facilities and populations to rear the large numbers of natural enemies needed for release in various locations. Exploration would continue for biological agents that attack the adult, nymphal, and egg stages of the glassy-winged sharpshooter. However, until an effective biological control program is developed, the more effective means of slowing the spread of the glassy-winged sharpshooter is to treat isolated infestations with an appropriate pesticide.

As described in Section 4.6.1, all treatment programs in non-agricultural areas would be preceded by public outreach meetings, held within affected areas at convenient locations. These meetings are designed to inform area residents of the program, what to expect, and how to prepare in advance, as well as answering questions and addressing individual concerns. Residents would be invited to these meetings through a combination of direct mail, personal contact, local media, and door flyers. In addition, occupants of all properties that would be treated as well as adjacent neighbors, would receive notification informing them of the applications prior to the treatment. This notice would include a product label and a local helpline telephone number for further

assistance. Notification materials may be translated into other languages to meet the needs of individual communities.

Schools, day care centers, rest homes, hospitals, etc. that are near treatment areas would be notified by direct communication to administrators (with schedules provided in writing), including information on whether or not that location is directly affected. If these locations undergo treatment, administrators of affected properties would be consulted and special scheduling (weekends or off-time hours) of applications arranged, if necessary.

The decision to treat a non-agricultural area resides with the county agricultural commissioner, in consultation with CDFA. Pesticide applications would be made by licensed pest control operators under the direct supervision of county agricultural departments and/or CDFA staff. All pest control operators would undergo training in CDFA-approved ground treatment protocols to ensure public safety, environmental protection, and quality assurance. The county agricultural commissioners would designate properties that require treatment and the chemical(s) to be used, the rate(s) of application, the host(s) to be treated, and any related protocols such as timing of treatments, number of applications, environmental restrictions, etc. The selection of any material and the course of action must be approved by CDFA in advance prior to application.

### **POST-TREATMENT EVALUATION**

Multiple surveys of treated properties would be conducted following treatments to assess the population levels of the glassy-winged sharpshooter, and determine the efficacy of the treatment. Depending on local factors, the timing of post-treatment surveys may be adjusted in order to maximize the probability of detection. This monitoring would continue for one or more life cycles of the pest.

### **ENVIRONMENTAL MONITORING**

Environmental monitoring of pesticide treatments and treatment areas in non-agricultural areas would be arranged for by CDFA and conducted by the CDPR to ensure proper application of the treatments. The Environmental Hazards Assessment Program (EHAP) of CDPR would conduct monitoring of selected pesticide treatments to provide information on the concentrations of the applied material in surface, irrigation, and storm runoff water, turf, soil, and air. Additionally, representative backyard vegetables and fruits could be sampled. In the event that ecologically

sensitive areas are present, toxicity to aquatic organisms will also be determined in surface water. The monitoring data would be used by CDFA to verify proper application rates and coverage and to monitor the environmental fate of the applied material. The data from environmental monitoring would be reviewed to ensure that applications do not lead to undesirable residue levels. Anomalous results would be evaluated to determine if application methods needed to be adjusted, and if so, the PDCP would require that treatments be modified accordingly.

The CDPR environmental monitoring protocols, including sampling methods, are provided in Appendix R. The proposed monitoring plan follows general models used in previous studies of insecticides applied by CDFA in prior eradication projects. This proposed monitoring plan would be followed in each new treatment area. More than one application event may be monitored; the total number of events to be monitored would be decided when the extent of the treatment program is known. The final matrices and total numbers of samples collected would be determined once this information is available. The monitoring data would be used by CDFA to verify proper application rate and coverage.

## **CHEMICAL ANALYSIS / TOXICITY TESTING**

### **Environmental Monitoring Results from the Emergency Program**

Monitoring results from the application of carbaryl in non-agricultural areas in Tulare, Fresno, Sacramento, Contra Costa, and Butte counties in the year 2000 during the emergency program are provided in Appendix S and summarized below. The latest monitoring results from each area treated can be found on the internet at <http://www.cdpr.ca.gov/docs/gwss/reports.htm>.

CDPR took samples from application equipment to determine the concentration of active pesticide ingredients. According to product label-directions, the target concentration for carbaryl after dilution is 0.11% to 0.21%. The applicators in Fresno, Sacramento, Contra Costa, and Butte Counties consistently achieved targeted label rates. Higher concentrations were noted in Tulare County. Once the higher concentration was noted, the mixing procedures were revised to achieve the correct concentration. Additional tank samples were then taken by CDPR.

CDPR found that air concentrations of carbaryl were found mostly at treated properties or those immediately adjacent. Currently there is no acute inhalation exposure limit established for carbaryl. CDPR has adopted 51.7 g/m<sup>3</sup> as an interim health screening level (Sanborn, 2000). The

highest concentration detected by air monitoring during actual application was at least 50 fold lower than the interim health screening level.

CDPR detected carbaryl at two surface water locations: (1) a drinking water treatment basin, and (2) a home fishpond in Sacramento County. The 0.125 parts-per-billion (ppb) detected at the drinking water treatment basin was well below the drinking water health action level of 60 ppb established by the California Department of Health Services (CDHS, 2000). The home fishpond, which had 6.94 ppb of carbaryl, resulted from the resident hosing down treated surfaces, causing water to runoff into the ground-level fishpond.

Residue monitoring on foliage found that, in general, the foliar coverages were relatively uniform. Higher foliar residue levels were detected in Tulare County, reflecting the higher rate used as shown by the tank mix samples. These levels were comparable to safe reentry levels for citrus. CDPR residue monitoring on produce samples found all residues of carbaryl were below the tolerance (i.e., within acceptable levels) for carbaryl of 10 parts-per-million (ppm) for all commodities sampled.

#### **4.6.5 RESEARCH**

A research program was initiated under the emergency program and would continue under the proposed PDCP. It is a coordinated effort to meet the long-term goal of reducing the impacts of *Xylella fastidiosa* on susceptible crops, including grape, almond, and oleander, and the short-term goal of controlling the glassy-winged sharpshooter. The research component of the PDCP is a joint effort among CDFA, Caltrans, USDA, the University of California (UC), affected counties, and industry groups. This effort is coordinated through the Research Subcommittee of the Pierce's Disease Advisory Task Force. The Subcommittee has representatives from the grape, citrus, nursery stock, and almond industries, and from CDFA, USDA, and UC. There are currently over forty scientists working on more than sixty projects funded by the state and federal government and private industry. Data collection, research, experiment management, and resource evaluation activities that do not result in major disturbances to an environmental resource are categorically exempt from CEQA (State CEQA Guidelines Section 15306).

To date, over 8 million dollars from public and private sources have been committed to a number of research efforts (Appendix T). The funded research combines short and long-term goals with

basic and applied research efforts to maximize the chances of developing the tools needed to solve the problems caused by *Xylella fastidiosa* in California, as follows:

- Short-term research goals focus on finding the tools needed to reduce the natural and artificial spread of the sharpshooter, including better understanding of the biology of the sharpshooter, and finding biological control agents.
- Medium-term objectives include learning how the sharpshooter selects host plants, analysis of the epidemiology of Pierce's disease, and determining if cultural practices can reduce plant infection rates.
- Long-term research focuses on Pierce's disease, including developing plant resistance to the disease.

CDFG would continue to focus on the ongoing development of the biological control element. As described in Section 4.6.3, several releases of *Gonatocerus triguttatus*, a tiny stingless wasp that parasitizes glassy-winged sharpshooter eggs, have been made throughout the state. Scientists from UC and CDFG are monitoring these release sites to determine if the wasps established and are having an impact on glassy-winged sharpshooter populations. Currently mass rearing operations for the wasp are not yet fully operational. Research would continue under the proposed PDCP to improve rearing operations and to determine the effectiveness of biological control agents against the glassy-winged sharpshooter.

CDFG initiated a pilot project in fall 2001 to study the effectiveness of constructing screens around nurseries to protect nursery stock from infestation by the glassy-winged sharpshooter. Shipment of nursery stock is a means for glassy-winged sharpshooters to move to uninfested areas. It is likely that this research would continue under the proposed PDCP. CDFG would share the results of the study with nursery owners and growers, who, if it is proven effective, may choose to use screens as a control method. The screens could be between 15 and 25 feet high and made of a mesh material similar to shade cloth. This research project would involve only a few nurseries.

The General Beale Road/Kern County pilot project is a research effort currently being conducted by researchers to study the effectiveness of different control methods on the glassy-winged sharpshooter in a large, agriculturally-diverse area. It is a cooperative effort involving federal, state, and local agencies, the University of California, and industry. The goal of the project is to

develop and test management options for the control of glassy-winged sharpshooter and Pierce's disease.

The PDCP would hold an annual research symposium at which researchers would detail results of their studies from the previous year to their peers and other professionals, and in a separate, less technical program, to the public. The first such full symposium took place in San Diego in early December 2001.

The current chairperson of the Pierce's Disease Advisory Task Force is also on the review panels for most of the industry groups funding Pierce's disease and glassy-winged sharpshooter research and on the review panel for most UC funding efforts. This ensures maximum coordination among the funding agencies and helps to eliminate duplication of research efforts.

#### **4.7 USES OF THE EIR**

As noted previously, CDFA is responsible for statewide development and coordination of the PDCP, with county agricultural commissioners or other agencies designated by the County Boards of Supervisors being responsible for local implementation, under direction from CDFA. CDFG, USFWS, and NMFS would be consulted as appropriate when PDCP activities are planned on property or resources under the control or stewardship of one of these agencies. This would include activities planned in the vicinity of sensitive habitats or the habitat of threatened or endangered species. Table 4-7 identifies agencies that may use this EIR in their decision-making. A more detailed description of the roles of the decision-making and consulting agencies is provided in Section 4.4 of this chapter.

CDFA receives a portion of the program funding for the emergency program from USDA. Use of federal funding is limited by agreement to conducting survey activities in various California counties for the glassy-winged sharpshooter, which are not the activities that may cause environmental effects. It is likely that USDA would continue to provide federal funding for survey activities in cooperation with the proposed PDCP. Because the federal funding does not support activities leading to environmental consequences, no significant adverse effects would occur. Any NEPA compliance requirements for the federal funding are being addressed by USDA.

This EIR may be used by CDFA to codify program elements, adopt PDCP regulations, and approve protocols, guidelines, workplans, and other elements developed to implement the PDCP. Standards and prescriptions for the emergency program have been adopted by emergency regulations contained in CCR Title 3, Chapter 4, Section 3650-3663. These regulations may be amended to further accomplish program purposes and further define the roles and responsibilities of CDFA and local agencies. The regulations will also be subjected to additional public review and comment, and may be amended for clarification and simplification, as necessary. Protocols and standards developed for the emergency program are provided as appendices to this Draft EIR. The glassy-winged sharpshooter statewide survey protocols (Appendix H), nursery shipping protocols (Appendix I), and a sample workplan (Appendix G) are provided. The standards for the movement of bulk grapes, plants, and bulk citrus are included in CDFA's Plant Quarantine Manual (pertinent sections provided in Appendix D). Similar protocols and sample workplans would be adopted for the proposed PDCP.

**TABLE 4-7: AGENCIES WHICH MAY USE THIS EIR IN THEIR DECISION-MAKING**

- |   |
|---|
| <ul style="list-style-type: none"><li>• California Department of Food and Agriculture (CDFA)</li><li>• County Boards of Supervisors</li><li>• The agency designated by each county's Board of Supervisors to implement the PDCP (typically county agricultural commissioners)</li><li>• California Department of Fish and Game (CDFG)</li><li>• U.S. Fish and Wildlife Service (USFWS)</li><li>• National Marine Fisheries Service (NMFS)</li></ul> |
|---|

This EIR may also be used by CDFA and designated local agencies to approve PDCP control activities against glassy-winged sharpshooter infestations throughout the state. CDFA may provide logistical support including carrying out any activity which is the responsibility of the designated local agency. Table 4-8 identifies the approvals that would be required to implement the program.

After completion of the Final EIR, CDFA will review the EIR for adequacy and consider it for certification pursuant to the requirements of Section 15090 of the State CEQA Guidelines. If the Final EIR is certified, CDFA may make a decision on whether to approve the proposed PDCP. Please refer to Chapter 1 for more information on the environmental review process.

**TABLE 4-8: PERMITS AND OTHER APPROVALS**

- CDFA approval of the proposed PDCP
- CDFA adoption of PDCP regulations, standards, and guidelines
- CDFA adoption of guidelines to implement the PDCP
- CDFA approval of each county's PDCP workplan
- County adoption of their local PDCP workplan
- CDFA and county approval of other implementing actions

CDFA would review and approve county workplans. County PDCP workplans would be examined in light of the program EIR to determine whether an additional environmental document must be prepared (State CEQA Guidelines 15168 (c)). Counties would incorporate additional program safeguards identified in the program EIR into county PDCP workplans if required. If a county finds that, pursuant to State CEQA Guidelines Section 15162, no new environmental effects would occur, or no mitigation measures would be required, CDFA can approve the workplan as being within the scope of the project covered by the program, and the county may adopt the workplan.

In accordance with State CEQA Guidelines Section 15162, additional CEQA documents would not need to be prepared for individual Pierce's disease control projects consistent with the PDCP, unless CDFA or the implementing county determines that:

- Substantial changes in the project or variations in a county's workplan are proposed that would involve new significant environmental effects or a substantial increase in the severity of previously identified significant effects, or
- Substantial changes occur with respect to the circumstances under which the project is undertaken that would involve new significant environmental effects or a substantial increase in the severity of previously identified significant effects, or
- Significant new information shows a need for additional analysis and disclosure of the environmental impacts of the program.

If any of the above conditions exists, or if activities outside the scope of the proposed PDCP are planned that may entail previously unrecognized or new environmental impacts, either CDFA or the implementing local agency would be required to provide an environmental review of those activities.

## 5.0 ENVIRONMENTAL ANALYSIS

This chapter consists of four sub-chapters that address the potential environmental impacts associated with the implementation of the proposed PDCP: Agriculture and Land Use, Hazards, Water Quality, and Biological Resources. Each chapter follows the same format, and consists of the following subsections:

- The **Existing Setting** section describes current conditions with regard to the environmental factor reviewed and the existing laws and regulations in place to ensure environmental impacts with regard to the environmental factor are minimized.
- The **Thresholds of Significance** provide guidance on how an impact is judged to be significant in this EIR. These thresholds are based on the State CEQA Guidelines (Appendix G, Environmental Checklist Form).
- The **Environmental Analysis** section provides an assessment of the potential impacts of the proposed PDCP, and tells why impacts were found to be significant or less than significant, or why there is no environmental impact. All impact conclusions are numbered. Mitigation measures and/or PDCP safeguards are numbered to correspond with impact conclusions. A summary of potential cumulative impacts is provided in Chapter 7 of this EIR.

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## **5.1 AGRICULTURE AND LAND USE**

This chapter includes a description of potential environmental impacts to agriculture and land use that could occur with the implementation of the proposed PDCP. Several PDCP components typically would not cause changes to the physical environment and thus would not have the potential to cause adverse environmental effects to agriculture and land use. These activities include research, public outreach, and survey and detection efforts. For this reason, the analysis in this chapter focuses only on the contain the spread and rapid response elements of the PDCP.

Some agriculture and land use effects are not typically considered "environmental" as defined by CEQA and the State CEQA Guidelines. The State CEQA Guidelines direct that economic or social effects of a project not be treated as significant effects on the environment (State CEQA Guidelines Section 15131(a)). In many cases, land use issues related to temporary disruption of use, or inconvenience, would be considered social effects, rather than physical environmental consequences.

Although economic and social effects are not defined as environmental issues, they are to be considered by public agencies when considering whether or not to approve a proposed project (refer to State CEQA Guidelines Section 15093(a)). Thus, discussions of economic and social effects are contained in this chapter to provide information to the community and decision-makers so that a balanced decision can be made.

### **5.1.1 ENVIRONMENTAL SETTING**

PDCP activities could occur in all areas of the state where Pierce's disease and/or the glassy-winged sharpshooter could cause damage. In non-agricultural areas, control measures could be used on a variety of lands, including residential yards, commercial and industrial areas, and public land, such as parks, school grounds, and transportation right-of-ways.

Pesticides are used throughout the state by growers, homeowners, commercial property-owners and public agencies. Pesticides are used by growers for production agriculture and post harvest fumigation, and by property owners for pest control around buildings and structures, landscape maintenance, and home and garden use. Pesticides are commonly used by state and local jurisdictions for pest control on right-of-ways, for public health purposes (including mosquito abatement work), for regulatory pest control, and for control and/or eradication of pest infestations.

### 5.1.2 THRESHOLDS OF SIGNIFICANCE

Pursuant to the suggested thresholds in Appendix G of the State CEQA Guidelines, the proposed program would have a significant environmental impact related to land use if it would:

- Physically divide an established community (State CEQA Guidelines, Appendix G).
- Conflict with an applicable land use policy adopted for the purpose of avoiding or mitigating an environmental effect (State CEQA Guidelines, Appendix G).
- Convert farmland to non-agricultural use, or involve changes to the environment which, due to their location or nature, could result in conversions of farmland to non-agricultural use (State CEQA Guidelines, Appendix G).
- Conflict with existing zoning for agricultural use, or a Williamson Act contract (State CEQA Guidelines, Appendix G).
- Result in economic or social changes that would lead to physical changes to the environment that are considered significant (State CEQA Guidelines, Section 15131).

The following analysis considers the components of the PDCP that have the potential to result in a physical impact on the environment. In addition, this chapter provides a discussion of potential social effects (e.g., land use disturbance that causes an inconvenience, but does not lead to a significant physical impact on the environment).

An analysis of the potential hazards related to the use of pesticides is provided in Chapter 5.2. In addition, please refer to Chapter 5.4 for an analysis of the effects of the PDCP on biological resources, including effects on beneficial insects.

### 5.1.3 ENVIRONMENTAL ANALYSIS

The components of the PDCP that have a potential to affect land uses are those actions that could result in a disruption of normal use activities, including agriculture and other types of uses. These actions include regulatory requirements for the shipment of agricultural commodities and treatment and control. Under the rapid response aspect of the program, non-agricultural areas could be treated with pesticides by ground crews if deemed appropriate by CDFA and the local county agricultural commissioner. This may occur when a new infestation is discovered outside of the generally infested area. No aerial treatment of pesticides over residential or urban areas is included in the PDCP.

In addition to the use of pesticides, the PDCP could also affect land use through the construction of facilities for rearing natural enemies of the glassy-winged sharpshooter. This issue is also discussed in the following analysis.

This section also considers whether the proposed PDCP would result in a negative environmental impact to agriculture. These considerations include the potential for the program to convert farmland to non-agricultural use or result in conflicts with agricultural zoning regulations.

### **PHYSICAL DIVISION OF A COMMUNITY**

**Impact LU-1: In general, the PDCP would not result in physical alterations to the landscape. Although the PDCP may require additional greenhouses or other facilities, development of these types of facilities would be limited in size and located in existing research or agricultural areas. Thus, no physical division of a community would occur. Consequently, there would be no significant effect.**

The PDCP could affect agricultural operations by requiring additional pesticide treatment and inspections of agricultural shipments. These activities could be disruptive, but would not result in a physical division of a community. In general, the activities related to the PDCP do not involve physical development or activities which would permanently change land uses. Although CDFA may require additional greenhouses and/or other facilities to continue research related to the biological control aspect of the program, it is anticipated that existing facilities would be leased by CDFA. If new facilities are required, they would most likely be developed on lands that are currently being used for agricultural purposes or a similar compatible use. Thus, greenhouse, laboratory, or other facilities that may be required would not be a significant change in land use, and would not result in a physical division of existing land uses. Further, additional environmental review of these facilities would occur when they are proposed for development, as required by Sections 15162 and 15168(c) of the State CEQA Guidelines.

**Mitigation Measure LU-1:** No mitigation is required for this less-than-significant impact. Additional environmental review of new facilities would occur when they are proposed for development, as required by Sections 15162 and 15168(c) of the State CEQA Guidelines.

## RESTRICTIONS ON THE MOVEMENT OF GOODS AND VEHICLES

**Impact LU-2: The PDCP includes restrictions on the movement of goods and vehicles. These restrictions could cause an inconvenience to producers, shippers, and receivers. Although the agricultural community could experience economic effects from shipment delays, these delays would benefit the overall economic health of the agricultural community by controlling Pierce's disease. Further, the inconveniences and economic effects related to the restrictions included in the PDCP would not result in physical changes to the environment, so no environmental impact would occur.**

As previously described in Chapter 4, the PDCP includes regulations requiring the inspection of nursery stock, bulk grapes, and citrus, and reasonable assurance that shipments are free of the glassy-winged sharpshooter. These regulations include the standards, certification requirements, and exemptions for the movement of bulk grapes, bulk citrus, and nursery stock from glassy-winged sharpshooter infested areas to non-infested areas. A copy of the shipment protocols for nurseries is provided in Appendix I. The emergency regulations for bulk grapes, plants, and bulk citrus are included in the CDFA Plant Quarantine Manual section provided in Appendix D.

The purpose of the regulations is to prevent the spread of the glassy-winged sharpshooter to new areas of the state. This would be achieved by regulating shipments of host plants and plant materials. To implement the regulations, surveillance for the glassy-winged sharpshooter would be strengthened at California's agricultural inspection stations and intrastate restrictions on those commodities that present a high risk of spreading glassy-winged sharpshooter would be enforced. Any grape grower, citrus grower, or nursery located in a glassy-winged sharpshooter infested area planning to ship bulk grapes, citrus, or nursery stock to areas outside the infested area would be required to comply with the glassy-winged sharpshooter control regulations. Regulations may also cover other commodities found to present a risk of moving the glassy-winged sharpshooter.

If any glassy-winged sharpshooter life stages are discovered in a shipment, the county may allow the shipment to be treated, or reject all or part of the shipment, and elect to have it destroyed. In some cases, growers may use pesticides to meet shipment protocols. Further information on the potential for hazards related to use of these pesticides is provided in Chapter 5.2.

These regulations would slow the movement of these commodities to other areas at a cost to growers, shippers, and receivers, and could result in economic effects to these parties. However, this would not result in physical changes to the environment.

**Mitigation Measure LU-2:** No mitigation is required for this less-than-significant impact.

### **TEMPORARY DISTURBANCE OF OCCUPANTS IN NON-AGRICULTURAL TREATMENT AREAS**

**Impact LU-3:** Under the rapid response component of the PDCP, non-agricultural areas could be treated with pesticides by ground crews. Residents and other site occupants would be notified prior to application of pesticides, and would be advised to avoid treated areas until re-entry conditions are met (typically approximately two hours). Providing ground crew access and avoiding treated areas could temporarily disrupt use of the treatment sites, which would cause an inconvenience to residents and occupants. However, this temporary inconvenience would not result in a significant effect to the physical environment, as defined by CEQA. (For a discussion of the potential for hazards related to pesticide use, please refer to Chapter 5.2.)

When a new infestation is discovered in a non-agricultural area, county agricultural commissioners may determine that implementation of a pesticide treatment program is necessary. Residents and occupants would be notified prior to application of pesticides. Access to residential and commercial yards would need to be provided to the ground crews. Schools, day care centers, rest homes, hospitals, etc. that are nearby or within any proposed treatment area would be notified by direct communication to administrators (with schedules provided in writing). Affected administrators would be consulted to arrange special scheduling (weekends or off-time hours) for pesticide applications.

It is anticipated that treatment would occur pursuant to consent of the landowner. If a landowner declines to consent to treatment, the county agricultural commissioner may exercise the authority conferred by the Food and Agricultural Code to abate public nuisances and treat the property. To exercise the abatement authority, the commissioner would be required to first obtain a warrant to enter the property. Historically, such actions are unusual and are only taken as a last resort when attempts to achieve voluntary cooperation are unsuccessful.

Residents would be advised to avoid treated areas until re-entry conditions are met (generally, when the pesticide is dry). In most cases, the pesticides would dry within two hours. Variables like temperature, weather, wind, amount applied, amount of shade, presence of other moisture (dew, irrigation), etc. can affect how long it takes the material to dry.

Providing ground crew access and avoiding the treated areas may be an inconvenience for some residents. However, this inconvenience would not result in a change in the physical environment, thus there would be no significant environmental effect.

**Mitigation Measure LU-3:** No mitigation is required for this less-than-significant impact.

### **DISRUPTION OF COMMERCIAL BEE COLONIES**

**Impact LU-4:** The proposed PDCP could result in temporary loss of some wild and hobby-kept bees. County agricultural commissioners would notify registered beekeepers within the treatment boundaries about program activities and hobbyist beekeepers would be notified of program activities through the general community notification process. Although measures are available to beekeepers to protect their bees, some loss could occur. However, loss of individual bees does not necessarily result in the loss of the bee colony. Such losses would not decrease bee populations below self-sustaining levels, because pesticide applications are limited to infestation areas and untreated areas would be accessible to the colony. Thus, impacts to bee colonies resulting from the PDCP are considered less than significant. For further discussion, refer to chapter 5.4.

Under the proposed PDCP, pesticides could be used during agricultural shipment and in the rapid response element. Many of the pesticides that could be used in the PDCP are toxic to bees. This section addresses the potential land use disturbances associated with the potential for temporary bee population reductions. The biological resource impacts by pesticides on beneficial insects are discussed further in Chapter 5.4.

Local county agricultural commissioners would notify registered beekeepers within the treatment boundaries about program activities in their area prior to treatment, so that the beekeepers can take whatever action they deem prudent to protect their beehives. Hobbyist beekeepers within treated areas would be notified of program activities as part of the general notification process.

Pesticide label instructions directed at minimizing potential impacts to bees include avoiding treatment and drift to blooming crops or weeds. Measures beekeepers can take to protect their colonies include covering the colonies, screening the entrance of hives, or moving hives away from the treatment area. Treatment would be limited to specific infested areas, so untreated areas would be available to the colony.

Despite these precautions, it is anticipated that there would be some loss of wild and hobby-kept bees and other pollinators. Based on CDFA experience and studies in prior eradication programs, these losses would be temporary in duration and limited in scope (Gary and Mussen, 1984). Although this could potentially cause short-term economic impacts to commercial beekeepers, this would not result in a significant change in the physical environment.

**Mitigation Measure LU-4:** No mitigation is required for this less-than-significant impact. Additional program safeguards to minimize the effect to bees include notification of registered beekeepers about program activities in their area prior to treatment. With this notification, beekeepers could take whatever action they deem prudent to protect their beehives. In addition, pesticide label instructions often prohibit application of the pesticide or allowing it to drift to blooming plants and weeds if bees are visiting the treatment area.

#### **DISRUPTION OF PEST MANAGEMENT PROGRAMS**

**Impact LU-5: The PDCP could result in a loss of some beneficial insect species that are a part of pest management programs. Such a loss could result in a disruption of normal agricultural operations. As a result, pest management programs may need to be adjusted where pesticide control of the glassy-winged sharpshooter is required. This disruption could result in an inconvenience and economic effects to growers; however, no significant environmental impacts are anticipated from the operational shift. (For a discussion of the potential for hazards related to pesticide use, please refer to Chapter 5.2.)**

In addition to impacts to bees, other beneficial or desirable species may also suffer temporary population reductions, e.g., ladybird beetles, lacewings, etc. Re-population from surrounding areas would occur when treatments cease. If chemical pesticide treatments are required for crops where pest management practices rely on the presence of beneficial insect populations (e.g., some citrus orchards), disruption of normal agricultural operations may be experienced. In integrated pest

management programs, beneficial insects are used to keep down populations of unwanted pests. If existing populations of beneficial insects are drastically altered, growers may find it necessary to increase their use of pesticides to combat pests other than glassy-winged sharpshooters. Such disruption in an established pest management program may lead to economic losses. Although this would result in an inconvenience to growers, this disruption would not result in a significant impact to the physical environment.

**Mitigation Measure LU-5:** No mitigation is required for this less-than-significant impact.

### **FACILITIES FOR THE BIOLOGICAL CONTROL COMPONENT OF THE PDCP**

**Impact LU-6: The PDCP may require the construction of additional greenhouses or other facilities. Where possible, existing facilities would be used. However, new facilities could be developed if existing facilities are not available. These facilities are anticipated to be located within existing agricultural areas or research facility sites. Thus, no significant environmental impacts are anticipated with the development of potential new greenhouses and laboratory facilities.**

The biological control component of the PDCP would require the use of greenhouses and laboratory facilities to rear adequate numbers of biological control agents for release. Separate greenhouses and laboratories would be needed for raising plants, glassy-winged sharpshooters, and natural enemies of the glassy-winged sharpshooter.

Under the emergency program, rearing operations have been conducted at locations in Kern and Riverside counties. Future plans call for renovating two large greenhouses in Riverside County to produce the biological control agents. As rearing operations expand, CDFA may procure additional greenhouse and laboratory facilities. CDFA may lease space in existing greenhouses and laboratory facilities or, if necessary, build new facilities.

Although the exact locations of future CDFA facilities have not been determined, it is anticipated that they would be located in agricultural areas, near potential release sites or at existing research facilities. Where possible, CDFA would use existing greenhouses and laboratory facilities. When existing facilities are used, land disturbance would not occur. If CDFA determines that new

facilities are required, they would be developed in areas where they are permitted uses under local zoning and land use regulations.

No significant environmental impacts are anticipated from the development of new facilities associated with the PDCP. Additional environmental review of these facilities would occur when they are proposed for development, as required by Sections 15162 and 15168(c) of the State CEQA Guidelines.

**Mitigation Measure LU-6:** No mitigation is required for this less-than-significant impact. Additional environmental review of new facilities would occur when they are proposed for development, as required by Sections 15162 and 15168(c) of the State CEQA Guidelines.

### **DISRUPTION OF ORGANIC FARMING**

**Impact LU-7: PDCP-related applications of pesticides could lead to temporary withdrawal of organic certifications for growers. Although this effect could be economically adverse to growers who wish to market organic products, it is not considered an impact to the physical environment under CEQA. Organic farms could be temporarily converted to non-organic farms; however, this conversion would not result in a conversion of agricultural lands to non-agricultural use. This impact is less than significant according to CEQA.**

Under the proposed PDCP, organic growers may be required to use pesticides to control the spread of the glassy-winged sharpshooter. As part of the emergency program, CDFA is evaluating the use of biological control agents and organic-approved pesticides to control the glassy-winged sharpshooter. As discussed in the program description, biological control agents have not yet proven to be sufficiently effective against the glassy-winged sharpshooter. Similarly, CDFA has found, based on available data, that natural pesticides and non-pesticide options, including biological control or physical controls, would not effectively lower glassy-winged sharpshooter numbers. (See Chapter 8 for a more detailed discussion of the efficacy of alternate control methods.) For these reasons, county agricultural commissioners may require organic growers to use conventional pesticides to control the glassy-winged sharpshooter when new infestations are found in organic cropland.

The PDCP regulations include the standards, certification requirements, and exemptions for the movement of bulk grapes, bulk citrus, and nursery stock from glassy-winged sharpshooter infested

areas to non-infested areas. Any grape grower, citrus grower, or nursery located in a glassy-winged sharpshooter infested area planning to ship bulk grapes, citrus or nursery stock to counties outside the known infested area would be required to comply with the glassy-winged sharpshooter control regulations, including organic growers. Regulations may also cover other commodities found to present a risk of moving the glassy-winged sharpshooter. If any viable glassy-winged sharpshooter life stages were discovered during the inspections required under the program, the county may allow the treatment of a shipment or reject all or part of the shipment and elect to have it destroyed or returned. Thus, an organic grower could be required to either treat their shipment with a pesticide, or be required to destroy or return the shipment.

PDCP-related applications of pesticides could lead to temporary withdrawal of certification from organic-certifying organizations. Although this effect could be economically adverse to those wishing to market organic products, it is not considered an impact to the physical environment. Growers required to treat their crops or shipments could continue to market their commodities as conventional produce (non-organic). Further, the conversion of an organic farm to a non-organic farm would not be considered a significant adverse environmental effect to agriculture since it would not result in the conversion of agricultural lands to non-agricultural use.

In addition, it is noteworthy that the limited treatment of organic agricultural lands does not necessarily mean that a grower would lose the ability to label and market produce as “organic.” California organic food statutes allow for the labeling and sale of organic produce treated with synthetic chemicals when such treatment is beyond the control of the grower (such as from drift or state eradication or control projects; see the California Organic Foods Act of 1990, California Health and Safety Code, Section 110825). The requirement is that residues on treated organic crops be less than 5% of the established U.S. EPA crop tolerances for the material applied.

As further stipulated by the National Organic Program, “when a prohibited substance is applied to a certified operation due to a federal or state emergency pest or disease treatment program and the certified operation otherwise meets the requirements of this [program], the certification status of the operation shall not be affected as a result of the application of the prohibited substance: provided that: (a) any harvested crop or plant part to be harvested that has contact with a prohibited substance applied as the result of a federal or state emergency pest or disease treatment program [and resultant residues are more than 5% of the U.S. EPA crop tolerances] cannot be sold, labeled,

or represented as organically produced” (National Organic Program Section 205.672, February 20, 2001).

**Mitigation Measure LU-7:** No mitigation is required for this less-than-significant impact.

### **FARMLAND CONVERSION**

**Impact LU-8:** The PDCP would not directly affect the potential conversion of agricultural lands to non-agricultural use. Rather, the PDCP would benefit the agricultural industry by supporting the economic viability of the state’s grape industry and perhaps other commodity groups. As a result, the program could prevent the indirect conversion of farmland to non-agricultural use. No significant environmental effect is associated with this issue.

The PDCP would not result in a conversion of agricultural lands to non-agricultural use. Further, the PDCP would not conflict with agricultural zoning, nor would it involve changes to the environment that could result in the conversion of farmland to non-agricultural use. To the contrary, the PDCP has been developed to protect the state’s grape industry, other commodities, and plant life by controlling Pierce’s disease. No significant adverse environmental effects would occur to farmland or the agricultural industry.

**Mitigation Measure LU-8:** No mitigation is required.

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## **5.2 HAZARDS**

This chapter describes the potential hazards associated with the proposed PDCP related to the use of pesticides. Several PDCP components do not have the potential to result in health hazards. These activities include research, public outreach, and survey and detection efforts. For this reason, the analysis in this chapter focuses only on the contain the spread and rapid response elements of the PDCP.

### **5.2.1 ENVIRONMENTAL SETTING**

PDCP activities could occur in all areas of the state that are potentially susceptible to Pierce's disease, and all areas capable of supporting the glassy-winged sharpshooter. A description of the existing threat and potential area of effect is provided in Chapter 3 of this EIR. The following section presents a summary of pesticide use in California and the regulatory framework for the use of pesticides.

#### **PESTICIDE USE IN CALIFORNIA**

Pesticides are used throughout California by state and local jurisdictions, and by private growers and homeowners for agriculture, pest control around building and structures, landscape maintenance, and for sanitation and public health purposes.

California requires commercial growers and pesticide applicators to report agricultural and commercial pesticide applications to local county agricultural commissioners. The California Department of Pesticide Regulation (CDPR) compiles this information into annual pesticide use reports. The most recent pesticide use data available are for the year 2000. In 2000, there were over 187 million pounds of pesticide active ingredients reported used in California (CDPR 2000c). Reported pesticide applications cover only a portion of the pesticides sold each year. Typically, the use of about two-thirds of the pesticide active ingredients sold in a given year is not subject to commercial use reporting. Examples of non-reported uses are home and garden use by homeowners, and the use of chlorine for municipal water treatment (CDPR, 2000c). Pesticides used in production agriculture constitute 92% of the total reported annual pesticide use in California for 2000 (Table 5.2-1). The annual reported use of pesticides in California fluctuates in response to a variety of factors, including changes in planted acreage, crop plantings, pest pressures, and weather conditions.

In 2000, the greatest pesticide use reported was in California's San Joaquin Valley. Fresno, Kern, Tulare, San Joaquin, and Madera counties in this region reported the highest pesticide use of all the counties in the state.

**TABLE 5.2-1: POUNDS OF PESTICIDE ACTIVE INGREDIENTS  
USED IN CALIFORNIA IN 2000**

Use	Pounds of Active Ingredients
Production Agriculture	172,145,719
Postharvest Fumigation	2,134,714
Structural Pest Control	5,164,844
Landscape Maintenance	1,395,421
All Others <sup>a</sup>	6,726,235
<b>Total Reported Uses</b>	<b>187,566,933</b>

<sup>a</sup> Included in "All Others" are pesticide applications reported in the following general categories: pest control on right-of-ways; public health which includes mosquito abatement work; vertebrate pest control; fumigation of nonfood and non-feed materials, such as lumber, furniture, etc.; pesticides used in research; and regulatory pest control used in ongoing control and/or eradication of pest infestations.

Note: In 1999, approximately 706,000,000 pounds of pesticide active ingredients were sold in California. The data include residential uses, which are approximated by CDPR as two-thirds of pesticides sold in any given year, or 470 million pounds in 1999. Sales data for 2000 were not available at the time this Draft EIR was printed.

Source: CDPR, 2000c

## REGULATORY FRAMEWORK

Under the proposed PDCP, pesticides would be used during regulatory requirements for the shipment of agricultural commodities and during treatment and control. Federal and state regulations impose requirements on the registration and use of pesticides; federal, state, and local agencies enforce these requirements. The regulatory framework pertaining to the use of pesticides, the management of hazardous materials, and health and safety of pesticide applicators and farm workers is discussed below.

### Federal Regulations

The U.S. Environmental Protection Agency (U.S. EPA) regulates pesticides under two major statutes: the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Federal Food, Drug, and Cosmetic Act (FFDCA). FIFRA requires that pesticides be registered (licensed) by the U.S. EPA before they may be sold or distributed for use in the United States, and that they perform their intended functions without causing unreasonable adverse effects on people or the environment

when used according to U.S. EPA-approved label directions. FFDCA authorizes the U.S. EPA to set tolerances, or maximum legal limits, for pesticide residues in food.

The U.S. EPA requires extensive data as part of its pesticide review and approval process, requiring more than 120 studies before granting a registration for most pesticides used in food production. These studies allow the U.S. EPA to assess risks to human health, domestic animals, wildlife, plants, ground water, and beneficial insects, and assess the potential for other environmental effects. When evidence arises which questions the safety of a registered pesticide, the U.S. EPA may take action to suspend or cancel its registration and revoke the associated residue tolerances. The U.S. EPA may also undertake an extensive special review of a pesticide's risks and benefits or work with manufacturers and users to implement changes in a pesticide's use (such as eliminating use on some crops, reducing application rates, or cancellation of a pesticide's uses). As part of its ongoing re-registration program, the U.S. EPA is systematically reviewing all pesticides registered before November 1984, to ensure that they meet current testing and safety standards.

The Food Quality Protection Act (FQPA) was signed in 1996 to amend both FIFRA and FFDCA and to strengthen the U.S. pesticide regulatory system. It mandates a single, health-based standard for all pesticides in all foods; provides special protection for infants and children; expedites approval of reduced risk pesticides; creates incentives for the development and maintenance of effective crop protection tools for American farmers; and requires periodic re-evaluation of pesticide registrations and tolerances to ensure that the scientific data supporting pesticide registrations will remain up to date in the future.

Enforcement of U.S. EPA's registration and residue tolerance decisions lies with other agencies. Registration-related requirements under FIFRA are enforced by the states. Residue tolerances are enforced through monitoring by the Department of Health and Human Services/Food and Drug Administration for most foods, and by the U.S. Department of Agriculture/Food Safety and Inspection Service for meat, poultry, and some egg products.

### **State of California Regulations**

California's pesticide regulatory program had its beginnings in 1911 when the first state law regulating pesticide product quality was passed. This was one year after the passage of similar federal legislation. In the 90 years since, a body of state law has grown to cover all aspects of

sales, possession, and use of pesticides in California. State law mandates protection of air and water and regulates reporting and use enforcement.

State programs addressing product registration, licensing and certification, data review and evaluation, and pesticide residue monitoring closely parallel federal programs. However, state data requirements are stricter than those of the federal government and the requirements are California-specific: manufacturers must prove their products are effective and can be used safely under California conditions.

CDPR coordinates an integrated network of programs to regulate pesticides, beginning with product evaluation and registration and continuing through use enforcement, environmental monitoring, residue testing, and re-evaluation, if deemed appropriate. CDPR works in partnership with county agricultural commissioners who act as local pesticide enforcement authorities. County agricultural commissioners evaluate, condition, approve, or deny permits for restricted-use pesticides; certify private applicators; conduct compliance inspections; and take formal compliance or enforcement actions. An overview of California pesticide regulations is provided below.

### **Pesticide Registration**

The Food and Agricultural Code (FAC), Section 12824, amended by Chapter 1092, Statutes of 1970, requires that pesticides be thoroughly evaluated and registered by CDPR before they are sold or used in California. CDPR is a department of the California Environmental Protection Agency (CalEPA). The FAC also requires applicants to conduct tests and studies necessary for CDPR's evaluation. Each applicant must submit data regarding product chemistry, environmental fate, efficacy, fish and wildlife effects, hazard to non-target organisms, worker exposure, and toxicology. When evaluating a pesticide proposed for registration, CDPR considers the toxic properties of a chemical and estimates the amount of the chemical that could potentially cause an adverse effect. This includes acute (one time), subchronic (one to three months) and chronic (long-term and lifetime) evaluations. CDPR adds an additional uncertainty factor to compensate for inevitable uncertainties in the process. The uncertainty factor takes into account the fact that there is a range of responsiveness to chemicals and that some individuals will respond before others.

These data are reviewed by several branches of CDPR, each focusing on different areas of expertise. Scientists in the Pesticide Registration Branch conduct reviews in the areas of chemistry, microbiology, plant physiology, pest and disease prevention, and fish and wildlife

biology. The Medical Toxicology Branch reviews toxicology studies to determine the potential for adverse health effects to humans that may range from acute toxicity to potential for chronic health effects. The Worker Health and Safety Branch assesses potential exposure to pesticide users and others and recommends avoidance measures where necessary. The Environmental Monitoring Branch evaluates pesticide products for potential to contaminate ground water, and for impacts on integrated pest management systems, when relevant concerns are identified.

A proposed decision to register or deny registration of a pesticide is reached once all reviews have been completed. Pursuant to FAC Section 12825, CDPR may refuse to register any pesticide: "(a) That has demonstrated serious uncontrollable adverse effects either within or outside the agricultural environment; (b) The use of which is of less public value or greater detriment to the environment than the benefit received by its use; (c) For which there is a reasonable, effective, and practicable alternate material or procedure that is demonstrably less destructive to the environment; (d) That, when properly used, is detrimental to vegetation, except weeds, to domestic animals, or to the public health and safety." Pursuant to FAC Section 13129(a), "if the director [CDPR], after evaluation of the health effects study of an active ingredient, finds that a pesticide product containing the active ingredient presents significant adverse health effects, including reproduction, birth defects, or infertility abnormalities, the director shall take cancellation or suspension action against the product pursuant to Section 12825 or 12826."

If any reviewing branch recommends against registration due to inadequate data, unacceptable studies or uncontrollable adverse effects, the product is not registered until concerns are resolved. In addition, CDPR consults with other public agencies and addresses concerns raised by state and local agencies before a decision is reached. A final decision to register or to deny registration is reached after providing an opportunity, through public notice, for any interested party to comment on the proposed registration decision.

The pesticide regulatory program has been certified by the Secretary of Resources as meeting the requirements of CEQA (State CEQA Guidelines Section 15251[i]).

## Environmental Hazards

The Environmental Hazards Assessment Program (EHAP) of CDPR has the lead role in implementing CDPR's environmental protection programs. EHAP collects data and analyzes the results from studies that are conducted to measure pesticide residues in the environment, characterize drift and other off-site pesticide movement, and evaluate the effect of application methods on movement of pesticides in air.

Many pesticide review and evaluation activities are mandated by state statutes, such as the Toxic Air Contaminant Act of 1983 (amended in 1984), which requires CDPR to conduct a review of the physical properties, environmental fate, and human health effects of specified priority pesticides. If determined to be a toxic air contaminant, appropriate control measures are developed to reduce emissions to levels that adequately protect public health. This is done in consultation with the California Air Resources Board (CARB). Control measures may include product label amendments, applicator training, restrictions on use patterns or locations, and product cancellation.

California Code of Regulations (CCR) Title 3, Section 6614 requires pesticide applicators to minimize drift by evaluating the equipment to be used, meteorological conditions, the property to be treated, and surrounding properties to determine the likelihood of health hazard or harm or damage to non-target crops, animals, or public or private property. No pesticide application may be made or continued if there is a reasonable possibility of creation of a health hazard or contamination of non-target property (FAC Sections 12976 and 12981, 11501 and 11791). CDPR and the county agricultural commissioners are charged with drift enforcement and investigating all incidents or suspected incidents of drift.

CDPR's residue testing program is designed to monitor compliance with pesticide laws and to help ensure that pesticide residues are within the established tolerance levels set by the U.S. EPA. CDPR takes samples of agricultural products at seaports and other points of entry into the state, packing sites, and at wholesale and retail outlets. All samples are tested with multi-residue screens capable of detecting more than 200 pesticides and breakdown products. Residues above established tolerance levels are rarely found. Violations more commonly involve commodities that contain traces of pesticides not registered for the commodity on which they are found. Most illegal residues are below 1 part per million (ppm) and are the result of residual traces of pesticides in soil or drift from adjacent applications, and not from direct misuse.

In 1985, California enacted the Pesticide Contamination Prevention Act (FAC Division 7, Chapter 2, Article 15), to prevent further pesticide pollution of ground water from agricultural use of currently registered pesticides. This act has been incorporated into CDPR's overall ground water protection program and provides a mechanism for identifying and tracking pesticides which have the potential to pollute ground water. The Pesticide Contamination Prevention Act requires CDPR to identify pesticide active ingredients with the potential to pollute ground water based on their specific chemical and physical properties and specific uses. These chemicals are placed on the Ground Water Protection List and groundwater is monitored by CDPR to look for these chemicals. The Pesticide Contamination Prevention Act establishes procedures for reviewing and modifying the use of pesticides found in ground water or in soil under certain conditions as a result of agricultural use. These may be necessary to prevent pesticides from reaching ground water at concentrations that would be considered pollution (CalEPA, 1997).

### **School Notification**

The Healthy Schools Act of 2000 (Education Code Sections 17608-17613 and FAC Sections 13180-13188) requires schools to notify parents, guardians, and school employees annually about pesticides used in their schools, and requires the CDPR to promote the voluntary adoption of integrated pest management (IPM) practices in California schools. Most provisions of the law took effect January 1, 2001. Each school is required to establish a list of parents or guardians who want to be notified before individual pesticide applications are made. Each school district is also required to ensure that warning notices are posted in areas where pesticides will be applied. These signs are to be posted at least 24 hours in advance and for 72 hours after application of pesticides.

### **Worker Health and Safety**

CCR Title 3, Division 6 includes pesticide worker safety regulations that specify safe work practices for employees who handle pesticides. CDPR and the local agricultural commissioner enforce the worker safety regulations. Pesticide applicators receive annual training that includes routine and emergency decontamination procedures, safety requirements for handling pesticides, and emergency first aid. The Pest Management and Licensing Branch administers CDPR's Licensing and Certification Program. This program is responsible for examining and licensing pest control operators and pest control advisors, and for certifying pesticide applicators who use, or supervise the use of, registered pesticides. Certified applicators must undergo a minimum of 20 hours of formal continuing education every two years to maintain their state certification.

The CCR also specifies label and warning requirements that must be met prior to pesticide application. Warning signs are required around farm fields after certain pesticide applications, and workers must be informed about other hazards. Field workers must receive training before working in treated fields and must receive training every five years. The training would include the importance of routine washing after exposure, the meaning of postings and Restricted Entry Intervals (REIs), information on where exposure to pesticides might occur, routes of exposure, symptoms of overexposure, and first aid.

The amount of time workers must stay out of a field after certain pesticides are applied to crops may be restricted. A REI is the period of time following a pesticide application when people are not allowed to go into the treated area unless protective measures are taken. This is to protect persons from potential exposure to hazardous levels of residues. REIs for many pesticides are stated on pesticide labels; others are established by regulation.

CDPR's Worker Health and Safety Branch conducts/monitors illness investigations to see if changes in procedures are needed to mitigate health risks.

### **Transport, Use, and Disposal**

CCR, Title 3, specifies requirements for proper storage, transportation, and disposal of pesticides and containers. CDPR and the county agricultural commissioners are responsible for enforcement. Pesticide labels provide instructions for proper handling, storage, and disposal of the pesticides, as required by the U.S. EPA.

As noted previously, all certified pesticide applicators must receive annual training that includes routine and emergency decontamination procedures, safety requirements for handling pesticides, and emergency first aid. In many counties, people who dispose of used pesticide containers must possess a permit or certificate issued by the agricultural commissioner.

Pursuant to Health and Safety Code Sections 25500-25520, all businesses that handle hazardous substances (in quantities equal to or greater than those established in Section 25503) are required to establish a business plan relating to the handling and release, or threatened release, of hazardous materials. The quantities established in Section 25503 are as follows: "a quantity at any one time during the reporting year equal to, or greater than, a total weight of 500 pounds, or a total volume of 55 gallons, or 200 cubic feet at standard temperature and pressure for compressed gas," or as

specifically required for a particular chemical by Part 30, Part 40, or Part 70 of Chapter 10 of Title 10 of the Code of Federal Regulations (54 Federal Register 14051), whichever is more restrictive. Basic information on the location, type, quantity, and health risks of hazardous substances handled, used, stored, or disposed of in the state which could be accidentally released into the environment is provided to firefighters, health officials, planners, public safety officers, health care providers, regulatory agencies, and other interested persons. Designated local "Certified Unified Program Agencies" (CUPAs) have the authority to inspect businesses that handle hazardous materials and have established area plans for emergency response procedures in case of an accidental spill of hazardous substances within their jurisdictions.

### **Enforcement and Surveillance**

CDPR enforces state and federal regulations that govern the safe and proper use of pesticides, including licensing of dealers and applicators, investigating pesticide incidents, ensuring product quality, and monitoring pesticide residues on commercial fresh fruits and vegetables. The county agricultural commissioners and their staffs (including approximately 400 biologists) carry out enforcement activities with training, coordination, oversight, and technical and legal support provided by state staff.

CDPR receives reports of suspected pesticide-related illness from two sources. California has a unique system that allows any employed person to visit a physician and claim that their illness or injury was acquired on the job. A report is then filed with the Department of Industrial Relations. In addition, California physicians have been required by law since 1971 to report all suspected pesticide-related illnesses or injury to their local health officer. Copies of these Pesticide Illness Reports must be sent to the local county agricultural commissioner and CDPR for investigation. Completed investigatory reports are evaluated for regulatory purposes and by toxicologists in the Worker Health and Safety Branch. Knowledge derived from illness investigations is one element in the continual evaluation of pesticide use and mitigation of associated risk.

### 5.2.2 THRESHOLDS OF SIGNIFICANCE

Pursuant to the suggested thresholds in Appendix G of the State CEQA Guidelines, the proposed program would create a significant hazard if it would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials (State CEQA Guidelines, Appendix G).
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (State CEQA Guidelines, Appendix G).

### 5.2.3 ENVIRONMENTAL ANALYSIS

As previously described, two aspects of the PDCP may involve the use of pesticides: 1) the regulatory portion of the contain the spread element, and 2) the rapid response element.

Prior to shipment of host plants outside of a generally infested area, growers would be required to show that their shipments are free from glassy-winged sharpshooters. Growers may have the option of conducting an intensive visual search of the shipment or treating the shipment with a registered pesticide to achieve compliance. Because many growers may choose to treat their shipments with pesticides to comply with CDFA shipment regulations, this EIR analyzes the potential hazards associated with this action.

Under the rapid response element of the proposed PDCP, when new infestations are found in non-agricultural areas, county agricultural commissioners may contract with licensed pesticide applicators to treat the areas. Notification would be given to property occupants prior to treatment. In developed areas, pesticides would be applied to the foliage of trees and shrubs, or to soil immediately below trees and shrubs, using ground application equipment. Open areas, such as grassy areas or open fields, would not be targeted for treatment because they do not contain suitable habitat for the glassy-winged sharpshooter.

Detection and delimitation activities would provide information on the location and severity of new glassy-winged sharpshooter infestations so that pesticide applications would be targeted where they are needed.

CDFA has evaluated a number of registered pesticides suitable for leafhopper control for use in the rapid response element of the PDCP. Under the emergency program, carbaryl (Sevin ["7"]®), imidacloprid (Merit®), and cyfluthrin (Tempo®) have been used in the rapid response element for treating non-agricultural areas. (The name in the parenthesis is the trade name of the pesticide used in the emergency program). An evaluation of the active ingredients and a general discussion of inert ingredients is provided in Appendix P. The total acreage treated and quantities of pesticides applied in non-agricultural areas under the emergency program from the start of the program in 2000 to September 7, 2001 is provided in Appendix U. It is likely that the use of these pesticides would continue in the proposed PDCP; however, as new information about the effectiveness of different pesticides against the glassy-winged sharpshooter becomes available, other registered pesticides may also be used. By law, use of these materials must comply with all pesticide regulatory requirements, including satisfactory toxicity evaluations with reasonable assurance of no harm when applied according to label directions.

Under the rapid response element of the PDCP, county agricultural commissioners may also require growers to use pesticides to control the glassy-winged sharpshooter in croplands. The application of pesticides on agricultural land would be conducted by private growers or owners and would not be funded by the state or the county. Growers could use any pesticide registered and approved for use on the commodity to be treated. Commercial cropland areas may be treated by aerial application if this application method is allowed in the area. Because this use of pesticides by growers would be required as part of the PDCP, the potential hazards associated with this action are analyzed in this chapter.

Growers could also use pesticides consistent with federal and state regulations when not specifically required by CDFA or county agricultural commissioners. The use of pesticides by private growers to control the glassy-winged sharpshooter on their own accord is covered under the CDPR pesticide regulatory program and is not subject to analysis in this EIR.

All pesticide applications must be in compliance with federal and state laws and regulations, as described in the regulatory framework above. Pesticide use in the proposed PDCP would vary spatially and temporally in response to a large number of variables, including the extent of the glassy-winged sharpshooter infestation in an area, weather, presence of endangered species, and previous control efficacy history at the specific site. Combinations of pesticides may also be used to improve efficacy as deemed necessary by the county agricultural commissioner.

## **PESTICIDES APPLIED IN NON-AGRICULTURAL AREAS**

**Impact Haz-1: As a result of pesticide application for the PDCP, people in non-agricultural areas could potentially come into contact with residues through skin contact, inhalation, or through ingestion of treated materials. The U.S. EPA and the California Department of Pesticide Regulation (CDPR) consider the potential exposure of people to residues of a pesticide when evaluating it for registration, and to determine any restrictions necessary to ensure that it can be used safely. Any pesticide employed in the PDCP is required to be registered and applied only in a manner consistent with its restrictions. The potential for spray drift from pesticides applied by ground personnel is monitored and limited by professional applicators. Pesticide application is also monitored by county agricultural commissioners and CDPR. The registration program, use restrictions, and monitoring would ensure that pesticides are applied with a reasonable certainty of no harm to human health or the environment. Therefore, this is a less-than-significant impact.**

Pesticide residues are the traces of pesticides left on leaves, fruits, vegetables, soil, and other surfaces after application. The concentration and duration of pesticide residues varies according to the chemical attributes of the pesticide used and environmental factors such as rainfall, temperature, soil conditions, etc. After application, human exposure to pesticides would be primarily through skin contact with these residues on foliage. Some pesticide residues could also be ingested from fruit and vegetables that had been recently treated with pesticides.

In addition, when pesticides are applied by ground crews, droplets are produced by the nozzles. Many of these droplets can be so small that they stay suspended in air and are carried by air currents until they contact a surface or drop to the ground. This is known as spray drift. A number of factors influence drift, including weather conditions, topography, the crop or area being treated, application equipment and methods and decisions by the applicator. The drift of spray from pesticide applications can expose people, wildlife, and habitats near the application site to airborne pesticide particles and off-target pesticide residues. The proximity of individuals to the pesticide application, the amount of pesticide drift, and the toxicity of the pesticide are important factors in determining the potential human exposure to pesticides from drift. Application in non-agricultural areas would only be conducted by professional applicators, who can readily monitor and limit spray drift.

The U.S. EPA and CDPR are responsible for evaluating pesticides and their uses to ensure that there is a reasonable certainty of no harm to human health and no unreasonable risks to the

environment. The U.S. EPA and CDPR consider whether the potential exposure of people to pesticide residues is likely to result in significant adverse health risks when evaluating a pesticide proposed for registration. The chemical characteristics of the active ingredient, its persistence in the environment, and whether or not it accumulates in the human body are evaluated to determine potential human health impacts. The U.S. EPA also considers the potential for drift to occur during the application of a pesticide proposed for registration (U.S. EPA, 1999). This information is used in determining whether a pesticide will be registered, and any appropriate label requirements that may be needed to ensure that the material can be used safely. If CDPR determines that information is lacking, or that there are uncontrollable adverse effects, the product is not registered until concerns are resolved.

The toxicity of a pesticide is related to the dose (specific amount) and the duration of time over which a dose is received. Toxic hazards can be mitigated by limiting potential human exposure to less than toxic amounts (see Appendix P for a more detailed discussion). Pesticide label restrictions can include restrictions on the types of plants to which the pesticide may be applied. Application procedures, application rates, and crop residue tolerances can be set low enough to ensure exposure to residues would not present an unreasonable risk to human health or the environment.

For example, the product label for Sevin ("7")® Carbaryl Insecticide (Appendix M), provides the following specific directions for use to minimize exposure to pesticide residues: "Start spraying at the farthest corner of the treatment area and work backward to avoid contact with wet surfaces. Spray thoroughly to wet upper and lower leaf surfaces, stems and branches. Allow spray to dry in treated areas before reentering. Repeat as necessary to maintain control, unless spray interval is specified, but not more than once a week." The product label also identifies a specific preharvest interval (PHI) indicating the minimum number of days between the last application and harvest, the appropriate mixing rate, and specific directions, including application intervals for a list of specific vegetables.

Furthermore, specific restrictions may be required on pesticide labels to reduce or prevent drift during application and limit off-target exposure to pesticides. Restrictions may include prohibiting the use of certain pesticides under certain weather and wind conditions; prohibiting certain methods of application; requiring use of a foliage barrier; or requiring a buffer zone distance between the site of application and areas to be protected. For example, the product label for Sevin ("7")®

Carbaryl Insecticide (Appendix M) provides the following specific directions for use to prevent drift: "Apply when air is calm to avoid drift and contact with eyes and skin"; "Do not apply when weather conditions favor drift from treated area"; "Do not apply this product or allow it to drift to blooming plants or weeds if bees are visiting the treatment area."

Under the proposed PDCP, only pesticides registered by the U.S. EPA and CDPR would be used by county agricultural commissioners and growers to meet PDCP requirements. For all program activities, pesticides would be applied according to label requirements by a licensed pesticide applicator. Because pesticides would be applied according to label requirements, the amount of residue on surfaces after application would not exceed the levels allowed for by pesticide regulatory agencies. Professional application reduces the potential for adverse exposure to individuals from the pesticides.

The Pesticide Use Enforcement Branch of CDPR and county agricultural commissioners enforce pesticide laws and regulations within their jurisdiction and investigate all incidents or suspected incidents of drift. The Environmental Monitoring Branch conducts residue sampling from environmental media and commodities during exotic pest eradication programs. Results from this monitoring program are evaluated with regard to commodity tolerances and expected leaf residue.

As part of the PDCP monitoring program in non-agricultural treatment areas, CDPR may take leaf punches, and fruit and vegetable samples to measure pesticide residues. CDPR would also monitor pesticide applications for potential air quality impacts. During the emergency program, residue levels did not exceed tolerances established by the U.S. EPA and CDPR, and spray residue was well below established acceptable levels.

Following the prescribed protocol for pesticide applications in the PDCP, no adverse human health impacts are foreseeable. The U.S. EPA and CDPR evaluate pesticides for potential effects on human health prior to registration and require appropriate use restrictions be present on the pesticide label to ensure a reasonable certainty of no harm to human health and the environment. CDPR's pesticide registration process has been certified as meeting the requirements of CEQA (State CEQA Guidelines Section 15251[i]). Professional application in compliance with pesticide labels ensures that pesticides used in the PDCP would not be detrimental to the public health and safety. This is a less-than-significant impact.

**Mitigation Measure Haz-1:** No mitigation is required for this less-than-significant impact. Additional program safeguards to minimize potential hazards include professional application of registered pesticides and monitoring of pesticide applications by CDPR to verify proper application rates and provide information about pesticide residues in the surrounding environment. The data from environmental monitoring would be reviewed to ensure that applications do not lead to undesirable residue levels. Anomalous results would be evaluated to determine if application methods needed to be adjusted, and if so, the PDCP would require that treatments be modified accordingly.

### **PESTICIDES APPLIED IN AGRICULTURAL AREAS AND NURSERIES**

**Impact Haz-2:** As a result of the PDCP, some growers and nursery owners may be required to treat their crops with pesticides to control the glassy-winged sharpshooter. Growers may choose to use aerial application over commercial cropland areas where allowed. Agricultural and nursery workers have a potential for exposure to pesticides. The U.S. EPA and CDPR consider the potential exposure of people to residues when a pesticide is proposed for registration to determine any application restrictions necessary and to ensure that it can be used safely. Pesticide use restrictions are imposed to ensure that agricultural and nursery workers are not exposed to pesticides residues before it is safe. Because of use restrictions, and monitoring, pesticide application in agricultural areas would occur with a reasonable certainty of no harm to human health. Therefore, this is a less-than-significant impact.

Through the rapid response element, when a new infestation is found in a cropland situation, county agricultural commissioners may require some growers to treat their crops with pesticides to control the glassy-winged sharpshooter. Growers could treat their crops with any pesticide registered for that use using application methods permitted by the pesticide label. Commercial agricultural cropland areas may be treated by aerial application, if this application practice is allowed in the area. Treatments would be made by licensed pesticide applicators, in compliance with pesticide label requirements, and with county agricultural commissioner oversight.

Agricultural and nursery workers have a potential for exposure to pesticides. Pesticide label restrictions, notification and monitoring programs, and training requirements have been developed to ensure a reasonable certainty of no harm to the health of agricultural and nursery workers. Pesticide labels indicate the amount of time workers must stay out of the field or nursery after

pesticides are applied. A restricted entry interval (REI) is the period of time, following a pesticide application, when people are not allowed to go into the treated area without additional personal protective gear. REIs for many pesticides are stated on pesticide labels; others are established by regulation. Both must be observed. Pesticide use restrictions ensure that agricultural field workers would not be exposed to pesticide residues before reentry is deemed safe.

CDPR's Pesticide Use Enforcement Branch and county agricultural commissioners enforce pesticide laws and regulations within their jurisdiction. In addition, CDPR's Worker Health and Safety Branch evaluates illness investigations to assure that workers and the general public are protected. By law, warning signs are required around farm fields after certain pesticide applications, and workers must be informed about other hazards. Field workers must receive training before working in treated fields and every 5 years. The training includes the importance of routine washing after exposure, the meaning of postings and REIs, information on where exposure to pesticides might occur, routes of exposure, symptoms of overexposure, and first aid.

With aerial applications over cropland there is a greater chance that drift of pesticides could occur on adjoining properties than by foliar ground spray or ground injection application methods. Pesticides would be applied by a licensed pesticide applicator according to label requirements. In addition, pilots must receive training and have a pest control aircraft pilot's certificate from CDPR. As described previously, application rates and label restrictions provide safeguards to avoid adverse impacts. During the registration process, U.S. EPA and CDPR consider the potential exposure of humans to pesticide residues. The U.S. EPA also considers the potential for drift to occur during the application of a pesticide proposed for registration (U.S. EPA, 1999). Reports of exposures of people, plants and animals to pesticides due to off-target drift are an important component in the scientific evaluation and regulation of the uses of pesticides (U.S. EPA, 1999). As described previously, application restrictions developed during the evaluation of pesticides for registration ensure that they can be used with a reasonable certainty of no harm to human health or the environment.

With the application restrictions and the implementation of established worker health and safety regulations, potential hazards related to the use of pesticides in agricultural areas and nurseries, including aerial applications over commercial cropland areas by individual growers, would be less than significant.

**Mitigation Measure Haz-2:** No mitigation is required for this less-than-significant impact. Additional program safeguards to minimize potential hazards include professional application of registered pesticides. California law requires that pilots receive training and have a pest control aircraft pilot's certificate from CDPR. In addition, specific worker health and safety regulations require notification of pesticide applications and training for field workers.

### **PESTICIDE USE IN AND AROUND FRAGILE POPULATIONS AND LOCATIONS**

**Impact Haz-3: Fragile populations, i.e., individuals who are susceptible to health complications because of health or developmental status (e.g., acutely ill, very young or old, or pregnant individuals), may be present in certain locations, such as parks, recreation areas, sports arenas, hospitals, nursing homes, adult care centers, day care centers, and schools. When evaluating a proposed pesticide, CDPR adds an additional uncertainty factor to compensate for inherent uncertainties in the process. The uncertainty factor takes into account the variability in susceptibility within populations. In addition, the PDCP includes measures to ensure that schools, day care centers, and similar places would be given special consideration in scheduling pesticide treatments, which would further limit the potential for pesticide exposure. With these measures, the potential for health hazards to fragile populations would be less than significant.**

Public concern has been expressed about the impacts of pesticides on populations considered sensitive based on health or developmental status, e.g., presence of acute or chronic illness, extremely young or old age, pregnancy, etc. Because of their comparatively frail nature, these individuals are oftentimes more prone to health complications, such as infectious diseases, trauma, nutritional deficiencies, etc. Certain land uses are noted for the presence of these populations. These locations include hospitals, nursing homes, adult care centers, day care centers, schools, and parks.

The application of pesticides to trees and shrubs around hospitals, nursing homes, and adult care centers does not pose per se, a special risk to those who reside or visit there. The U.S. EPA and CDPR evaluate pesticides and their uses to ensure that they can be used with a reasonable certainty of no harm to human health and the environment. When evaluating a proposed pesticide, CDPR adds an additional uncertainty factor to compensate for inherent uncertainties in the process. The uncertainty factor takes into account the variability in susceptibility within populations. (See

Appendix P for a more detailed discussion of the evaluation of chemical toxicity.) Because people at medical care facilities and facilities that provide adult support services do not engage in behavior that would bring them into extensive contact with treated vegetation, they would not typically be exposed to pesticide residues. This has been verified through environmental monitoring (Appendix P).

Physiologically, existing data do not suggest children are substantially more susceptible to chemical injury than are physically mature individuals, although there are exceptions related to specific chemicals. In some cases, children actually show increased rather than decreased tolerance to some chemicals compared with mature individuals (Appendix P). However, children are more likely than adults to physically contact treated surfaces, and thereby receive proportionately greater doses than adults.

School environments receive special attention when it comes to pesticide use. A number of states have passed legislation requiring special procedures and notifications when pesticides are used on school grounds, and individual school districts may have separate policies that address pesticide use on school property. The California Healthy Schools Act of 2000 (Education Code Sections 17608-17613 and FAC Sections 13180-13188) requires schools to notify parents, guardians, and school employees about pesticides used in their schools. Each school district is required to ensure that warning notices are posted in areas where pesticides will be applied. Should it be determined that treatment of a school ground or day care center is necessary for glassy-winged sharpshooter control, applications would be scheduled to avoid times when school is in session or special activities are occurring. In unusual circumstances (e.g., when schools have night classes, or evening events) school administrators may request that treatment occur when the grounds are occupied. However, the use of pesticides in these circumstances could be controlled to ensure that restricted entry intervals are adhered to for the treated areas, consistent with pesticide label specifications. Schools and day care centers may instruct children to avoid treated plantings when on the playground to minimize exposure to pesticide residues.

Because pesticide applications in non-agricultural areas are to be selectively directed onto trees and shrubs by ground personnel and not applied as a cover spray to open areas, potential pesticide exposure of visitors to parks and recreation areas would be limited to activities that put visitors in contact with treated foliage. Visiting a park would not provide exposure different from residential property exposure. Recreational activities that could bring participants regularly into contact with

treated plants are limited. Younger children are more likely to touch plantings as they play and explore. It is these activities that provide direct exposure.

Under the proposed PDCP, schools, day care centers, rest homes, and hospitals that are nearby any proposed treatment operations are notified prior to treatment and special scheduling would be arranged, if necessary. Pesticide treatments in parks, malls, large apartment complexes, and other busy public areas would be scheduled for off-time hours. Notices of treatment would be posted on trees, benches, traffic medians, common areas, or bulletin boards at affected locations and additional project staff may be assigned to monitor the treated areas in order to divert pedestrians until re-entry conditions are met (usually when materials have dried).

Like PDCP treatments in other non-agricultural areas, CDPR would conduct monitoring of selected treatments in areas where fragile populations tend to be present to ensure proper application of the materials. Samples would be taken from surface water, turf, soil, and air to provide information about pesticide concentrations after treatment. The data from environmental monitoring would be reviewed to ensure that applications do not lead to undesirable residue levels. Anomalous results would be evaluated to determine if application methods needed to be adjusted, and if so, the PDCP would require that treatments be modified accordingly. As stated previously, under the emergency program, residue levels did not exceed residue tolerances established by the U.S. EPA and CDPR, and spray residue was well below established acceptable levels, which are designed to ensure hazards related to pesticide drift are less than significant (Appendix S).

There are individuals identified either as “chemically sensitive” or “chemically injured,” who have experienced adverse health events that they associate non-specifically with numerous chemical exposures. There is no established mechanism or measurable biological marker that defines reactions reported by members of this group. The reactivity of this group cannot be objectively evaluated because there are no objective criteria to apply to evaluate individual agents or to evaluate the individuals themselves. The issue is not toxicity, but a characteristic, apparently separate from any defined chemical, physiological, or pharmacological property. While this group of individuals may feel they are affected by pesticide application, predictions of substantial health consequences are not substantiated in the literature, individual claims notwithstanding. The PDCP includes advance public notification procedures to alert the community, including those who feel sensitive about treatment actions. Notification would provide the opportunity for any individual to avoid application areas, if they wish.

Notification and special treatment scheduling would reduce the pesticide exposure potential at group locations. In addition, when a proposed pesticide is evaluated, CDPR adds an additional uncertainty factor to compensate for inherent uncertainties in the process. The uncertainty factor takes into account the variability in susceptibility within populations. For these reasons, the potential hazard to fragile populations is considered less than significant.

**Mitigation Measure Haz-3:** No mitigation is required for this less-than-significant impact. Additional program safeguards to reduce potential health impacts to fragile populations include notification of schools, day care centers, rest homes, and hospitals that are nearby any proposed treatment operations prior to treatment. Special scheduling would be arranged if necessary. Pesticide treatments on school grounds and busy public areas would be scheduled for off-time hours when feasible. CDPR would conduct monitoring to verify proper application rates. The data from environmental monitoring would be reviewed to ensure that applications do not lead to undesirable residue levels. Anomalous results would be evaluated to determine if application methods needed to be adjusted, and if so, the PDCP would require that treatments be modified accordingly.

## **WORKER HEALTH AND SAFETY**

**Impact Haz-4: Pesticide applicators and agricultural workers have the greatest potential for exposure to pesticides. PDCP pesticide applications would be made by licensed pesticide applicators. All licensed applicators are certified through the Licensing and Certification Program administered by CDPR. Pesticide applicators receive annual training that includes routine and emergency decontamination procedures, safety procedures and requirements for handling pesticide materials, and emergency first aid measures. Pesticide use restrictions are in place to ensure that agricultural field workers are not exposed to pesticide residues before it is safe. Compliance with these restrictions by the PDCP would avoid significant hazards to the health and safety of workers.**

As previously noted, toxicity is related to dose and duration of exposure. Persons with the greatest risk of developing a pesticide-related illness are those whose exposure is highest, such as workers who mix or apply pesticides, and field workers who are regularly exposed to pesticide residues.

PDCP pesticide applications would be made by licensed pesticide applicators. Pesticide product labels provide instructions for proper handling, storage and disposal of the product. All personnel who apply pesticides receive training at least once a year. This training consists of an annual review concerning all aspects of the pesticide products the applicator may be handling that year. This includes training on routine and emergency decontamination procedures, safety procedures and requirements for handling pesticide materials, and emergency first aid measures. All applicators are certified through CDPR's Licensing and Certification Program. Applicators must also undergo a minimum of 20 hours of formal continuing education every two years to maintain their state certification.

Pesticide worker safety regulations specify safe work practices for employees who handle pesticides or work in treated areas. CDFA and county agricultural department staff must comply with existing occupational health and pesticide worker safety laws and regulations and thus pesticide applicators would not face greater occupational risks than those engaged in similar labor (i.e., routine pesticide application in agriculture, landscape gardening, structural pest control, etc.).

As described previously in the discussion of pesticides applied in agricultural areas and nurseries, regulations and programs are in place to protect agricultural workers. Pesticide labels indicate the amount of time workers must stay out of the field after pesticides are applied to crops. Pesticide label restrictions, notification and monitoring programs, and training requirements have been developed to ensure a reasonable certainty of no harm to human health. With the implementation of established worker health and safety regulations, potential hazards to workers related to the use of pesticides would be less than significant.

**Mitigation Measure Haz-4:** No mitigation is required for this less-than-significant impact.

California worker health and safety regulations specify safe work practices for employees who handle pesticides or work in treated areas. The regulations require certification and training for pesticide applicators, notification of pesticide applications, and training for field workers. CDPR and county agricultural commissioners enforce worker safety regulations.

## TRANSPORT, USE, AND DISPOSAL OF PESTICIDES

**Impact Haz-5:** The program would not result in an increased risk of accident or likelihood of upset. However, because the effects of pesticides are related to dose, potential impacts to human health could occur with accidental spills and improper use and disposal of pesticides. Licensed pesticide applicators receive training on routine and emergency decontamination procedures, safety requirements for handling pesticides, and emergency first aid. While it is possible that an accident could occur with implementation of the PDCP, the program would not result in an increase in accident risk. PDCP safeguards and annual training of licensed pesticide applicators would ensure that these risks would be less than significant.

The proposed PDCP poses a risk of pesticide release through accidental spills. As previously described, there are numerous federal and state laws and regulations that strictly control and regulate the storage, transport, handling, use, and disposal of pesticides (e.g., Federal Insecticide, Fungicide and Rodenticide Act; FAC Divisions 6 and 7, CCR, Title 3, Division 6).

Pesticide labels provide instructions for proper handling, storage, and disposal of pesticides. Licensed pesticide applicators receive training on routine and emergency decontamination procedures, safety requirements of handling pesticides, and emergency first aid (CCR Title 3, Section 6724).

Also, local jurisdictions conduct inspections of businesses that handle hazardous materials and have established area plans for emergency response procedures in case of an accidental spill of hazardous substances (Health and Safety Code Sections 25500-25520). While it is possible that an accident could occur with implementation of the PDCP, the program would not result in a significant increase in accident risk. PDCP policies and practices, and training of licensed pesticide applicators would ensure that these risks would remain less than significant.

**Mitigation Measure Haz-5:** No mitigation is required for this less-than-significant impact. Pesticide labels provide instructions for proper handling, storage, and disposal of pesticides. Licensed pesticide applicators receive training on routine and emergency decontamination procedures, safety requirements for handling pesticides, and emergency first aid procedures. Moreover, local jurisdictions maintain emergency action and preparedness plans in case of an accidental spill.

## **5.3 WATER QUALITY**

This chapter describes the potential impacts of the proposed PDCP on water quality. Activities such as research, public outreach, and survey and detection efforts do not involve water impacts. For this reason, the analysis in this chapter focuses only on the contain the spread and rapid response elements of the PDCP.

### **5.3.1 ENVIRONMENTAL SETTING**

PDCP activities could occur in all areas of the state susceptible to Pierce's disease, and all areas capable of supporting the glassy-winged sharpshooter. The following sections provide a general overview of waters of the state and the regulations that govern the protection of water quality.

#### **WATERS OF THE STATE**

Waters of the state include surface water bodies (e.g., rivers, lakes, and the ocean) as well as ground water. In the State of California, water resources not only provide domestic and agricultural water supplies for consumption, but also provide recreation opportunities and important habitat for the state's wildlife and aquatic resources.

Within California, there are two primary sources of surface water: the Colorado River and the Sacramento-San Joaquin Delta. The Delta serves as a major water source for approximately two-thirds of the state. Two major rivers feed the region: the Sacramento River from the north and the San Joaquin River from the south. The mixture of fresh water from these two waterways and their tributaries combine with ocean water from the San Francisco Bay to create the largest estuary on the west coast of North America. In addition to these surface water bodies, the state's water resources include complex networks of ground water resources, which are linked to surface water bodies through points of discharge.

The beneficial uses of the waters of the state that are protected against quality degradation include, but are not limited to, domestic, municipal, agricultural, and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

Both man-made and natural substances contaminate surface water and ground water. Water contamination may arise from point or non-point sources. Point source contamination occurs when a contaminant comes from a defined area such as from spills (improper handling, storage, and disposal) or direct release into a water body from a vehicle, vessel, or facility.

Non-point source contamination occurs when contaminants reach a water body from a large area or watershed. Non-point source pollution includes runoff from city streets, construction sites, and agricultural fields; leaking underground storage tanks; spills from unknown sources; and abandoned mines.

### **REGULATORY BACKGROUND**

Both the California Department of Pesticide Regulation (CDPR) and the State and Regional Water Quality Control Boards have responsibility for protecting water quality from the potential adverse effects of pesticides. The Food and Agricultural Code (FAC) authorizes CDPR to register pesticides for sale and use in the state. The FAC also authorizes CDPR and the county agricultural commissioners to regulate the sale, storage, handling, and use of pesticides, and states that one of the purposes of the pesticide regulatory program is to protect the environment from harm from pesticides. The California Water Code (CWC) states that the State and Regional Water Quality Control Boards are the state agencies with primary responsibility for the coordination and control of activities related to water quality.

The FAC and the CWC provide overlapping authorities for protecting water quality, including contamination from pesticides. The California Pesticide Management Plan for Water Quality has been developed to identify ways CDPR and the county agricultural commissioners will work in cooperation with the State and Regional Water Quality Control Boards to protect water quality from pesticide contamination.

In addition to regulations governing surface and ground water quality, additional regulations govern the delivery of safe drinking water to the state's population.

### **Surface Water**

State law requires CDPR to thoroughly evaluate pesticides before they are registered and sold or used in California. During the evaluation process, CDPR evaluates potential water quality

problems associated with specific uses of pesticides, including use on sites where pesticides are likely to move with runoff or irrigation water into surface waterways. CDPR gives special attention to the potential for toxicity to the aquatic biota and to factors that may interfere with attaining water quality objectives. CDPR also monitors surface water at the request of other state agencies.

Section 303 of the Clean Water Act requires states to adopt water quality standards for surface waters. Regional Water Quality Control Boards adopt Basin Plans that establish water quality objectives; describe implementation programs to achieve these objectives; and describe surveillance and monitoring activities to evaluate the effectiveness of the water quality control program (CWC Section 13170). The State Water Quality Control Board adopts Statewide Plans to address water quality concerns for surface waters that overlap Regional Water Quality Control Board boundaries or are statewide in scope.

### **Ground Water**

In 1985, California enacted the Pesticide Contamination Prevention Act (FAC Division 7, Chapter 2, Article 15), to prevent pesticide pollution of ground water from agricultural use of pesticides. This act has been incorporated into CDPR's overall ground water protection program and provides a mechanism for identifying and tracking pesticides with the potential to pollute ground water. The Pesticide Contamination Prevention Act requires CDPR to identify pesticide active ingredients having the potential to pollute ground water based on their specific chemical and physical properties and specific uses. These chemicals are placed on the Ground Water Protection List and are monitored by CDPR in ground water. The Pesticide Contamination Prevention Act establishes procedures for reviewing and modifying the use of pesticides found in ground water or in soil under certain conditions as a result of agricultural use. These use modifications are designed to prevent pesticides from reaching ground water at concentrations that would be considered pollution (CalEPA, 1997).

### **Drinking Water Supplies**

Water supply agencies must comply with both water quality and drinking water standards. The Safe Drinking Water Act (SDWA) is the main federal law regulating drinking water quality to protect public health.

### 5.3.2 THRESHOLDS OF SIGNIFICANCE

Pursuant to the suggested thresholds in Appendix G of the State CEQA Guidelines, the proposed program would have a significant impact to water quality if it would:

- Violate any water quality standards or waste discharge requirements (State CEQA Guidelines, Appendix G).
- Otherwise substantially degrade water quality (State CEQA Guidelines, Appendix G).

### 5.3.3 ENVIRONMENTAL ANALYSIS

As previously described, two aspects of the PDCP may involve the use of pesticides: 1) the regulatory portion of the contain the spread element, and 2) the rapid response element, which may include pesticide treatment of new infestations of the glassy-winged sharpshooter. In all situations, pesticides would be applied by licensed pesticide applicators in compliance with pesticide label requirements.

#### **POTENTIAL IMPACTS OF PESTICIDES ON SURFACE WATER QUALITY FROM NON-AGRICULTURAL TREATMENTS**

**Impact WQ-1: The active ingredients of the pesticides to be used for the control of the glassy-winged sharpshooter can reach surface water after rainfall or as a result of spray drift.**

**Applying pesticides consistent with label requirements would reduce potential water quality impacts. Pesticide application requirements vary; however, they do not allow direct application to water if there are potentially significant water quality impacts associated with surface water applications. In addition, pesticide labels also require precautions be taken against contaminating water as a result of equipment use and cleaning. When a pesticide is evaluated for registration, the U.S. EPA and CDPR consider how it breaks down in water environments. Application restrictions are developed based on these data. For these reasons, the potential for adverse water quality impacts related to non-agricultural pesticide treatment is considered less than significant.**

During the evaluation of pesticides proposed for registration, the U.S. EPA and CDPR consider how a pesticide breaks down in water environments, and its toxicity to fish and other aquatic species. The Environmental Hazards section on pesticide labels instructs applicators how to avoid non-target impacts to water bodies. For example, some pesticide labels instruct the applicator to

avoid direct application or drift onto water or sensitive areas (i.e., wetlands) due to potential toxicity of materials to fish and invertebrates. Although there is some variation in the habitats to be avoided, they usually include lakes, streams, marshes, and intertidal areas below the mean high water mark. The label may require that fish ponds or other open bodies of water on a property be covered during treatment of the surrounding vegetation. Label requirements also include measures to minimize the potential for pesticide runoff into water bodies. These actions greatly reduce the chance of pesticides being washed into surface water in an amount that is toxic to aquatic life. Pesticide labels also require that precautions be taken against contaminating water when disposing of equipment washwaters. If CDPR determines that the use of a pesticide proposed for registration would likely result in significant adverse impacts that cannot be avoided or adequately mitigated, registration is not granted (CalEPA, 1997).

For example, the product label for Sevin ("7")® Carbaryl Insecticide (Appendix M) provides the following specific directions to protect water from pesticide residues: "Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water by cleaning equipment or disposal of wastes."

Under the proposed PDCP, only pesticides registered by the U.S. EPA and CDPR (CalEPA) would be used by county agricultural commissioners and growers implementing PDCP program requirements. For all program elements, pesticides would be applied by a licensed pesticide applicator according to label requirements.

In addition to following label requirements, CDFA would consult with the National Marine Fisheries Service (NMFS) prior to pesticide treatments that could potentially result in water quality impacts in streams or water bodies that empty into the ocean. CDFA would work with NMFS to develop additional avoidance measures if it determines an unacceptable risk of water quality impacts exists.

CDFA has contracted with CDPR to monitor applications of pesticides in non-agricultural areas under the PDCP, when appropriate. CDPR would sample the concentration of pesticide in the application storage tank, in nearby surface waters, in the air, and on treated foliage before and after application. In the event that ecologically sensitive areas are present, toxicity to aquatic organisms would also be determined in surface water. Surface water sampling may be conducted again following the first rain or irrigation event post-treatment. Drains, streams, and ponds may be

tested. The data from environmental monitoring would be reviewed to ensure that applications do not lead to undesirable residue levels. Anomalous results would be evaluated to determine if application methods needed to be adjusted, and if so, the PDCP would require that treatments be modified accordingly.

No significant impacts to water quality are expected to result from the prescribed PDCP treatment protocol for glassy-winged sharpshooter. Although many pesticides can potentially be significant water contaminants, the manner in which they would be used makes the potential for water contamination less than significant. There would be no direct application to water bodies. The potential for localized off-site runoff into surface waters is less than significant, both as to amount and frequency.

**Mitigation Measure WQ-1:** No mitigation is required for this less-than-significant impact. Additional program safeguards that mitigate potential impacts to water quality include using licensed pesticide applicators with oversight by county agricultural commissioners and monitoring by C DPR to ensure proper application of the materials. All pesticide label requirements, including those specifically intended to avoid impacts to water quality, would be followed. C DPR would sample surface water when appropriate, both before and after PDCP pesticide treatments in non-agricultural areas. The data from environmental monitoring would be reviewed to ensure that applications do not lead to undesirable residue levels. Anomalous results would be evaluated to determine if application methods needed to be adjusted, and if so, the PDCP would require that treatments be modified accordingly.

#### **POTENTIAL IMPACTS OF PESTICIDES ON SURFACE WATER QUALITY FROM TREATMENTS IN AGRICULTURAL AREAS**

**Impact WQ-2:** Aerial pesticide applications may be used in agricultural areas to implement the PDCP. Like treatments by the county in non-agricultural areas, pesticide application would be by licensed pesticide applicators according to product label directions. Pesticide label requirements specifically prohibit applicators from allowing application or drift over water bodies. In addition, pesticide labels require precautions be taken against contaminating water as a result of equipment use and cleaning. Because applicators are required to follow all pesticide label requirements to avoid adverse impacts to surface waters from direct application or runoff, the potential for adverse impacts to water quality are not considered significant.

Growers in areas affected by glassy-winged sharpshooter infestations could be required by county agricultural commissioners to treat their crops with pesticides to control new infestations of the glassy-winged sharpshooter or to reduce existing populations. Growers may treat their crops by aerial application if this application method is allowed in the area. Like treatments by the county in non-agricultural areas, pesticides would be applied by licensed pesticide applicators according to label directions, although the grower and not the county would pay the cost of treatment. As described previously, pesticide label requirements specifically prohibit applicators from allowing application or drift over water bodies. Treatments would be made by licensed pesticide applicators, in compliance with pesticide label requirements and with oversight by the local county agricultural commissioner. Pilots must receive training and have a pest control aircraft pilot's certificate from CDPH prior to conducting aerial pesticide applications. CDPH and county agricultural commissioners are charged with enforcement of all pesticide regulations. Because growers and pesticide applicators are required to follow all pesticide label requirements to avoid water quality impacts to surface waters from direct application or runoff, water quality would not be notably changed by PDCP pesticide uses. Thus, this is considered a less-than-significant impact.

**Mitigation Measure WQ-2:** No mitigation is required for this less-than-significant impact. Licensed pesticide applicators would follow pesticide label requirements, including those to avoid adverse impacts to water quality.

### **POTENTIAL PESTICIDE IMPACTS TO GROUND WATER**

**Impact WQ-3: The active ingredients of some pesticides could reach ground water by infiltration from treated ground surfaces (see Appendix P). Label requirements on pesticides containing active ingredients with these attributes include measures to avoid adverse impacts to ground water. In addition, the quantity and frequency of use of these pesticides is such that significant ground water quality impacts would not occur. During PDCP pesticide treatment, licensed pesticide applicators would follow all pesticide label requirements. Thus, the potential for impacts to ground water are considered less than significant.**

Some pesticides used in the PDCP could potentially reach ground water by infiltration from treated ground surfaces. During the evaluation of pesticides proposed for registration, the U.S. EPA and CDPH consider whether or not pesticide active ingredients have the potential to reach ground water

by leaching or percolation. This is based on specific chemical and physical properties, and specific use. Label requirements on pesticides containing active ingredients which have the potential to pollute ground water include measures to avoid adverse impacts to ground water, including avoiding treatment of areas that are saturated with water. The Pesticide Contamination Prevention Act establishes procedures for reviewing and modifying the use of pesticides found in ground water or in soil under certain conditions as a result of agricultural use. These use modifications are designed to prevent pesticides from reaching ground water at concentrations that would be considered pollution (CalEPA, 1997).

Imidacloprid, a pesticide currently used in the emergency program, is listed in CDPR's ground water protection list under CCR, Title 3, Section 6800(b). Imidacloprid has physical-chemical properties, such as long half-life, high water solubility, and low soil absorption, that makes it a potential leacher. The Merit® 75 WP (imidacloprid) product label identifies the following use restrictions to avoid adverse effects to ground water: "applications should not be made when turfgrass areas are waterlogged or the soil is saturated with water," and "avoid runoff or puddling of irrigation water following application."

During PDCP pesticide treatment, licensed pesticide applicators would follow all pesticide label requirements, including those specifically for avoiding adverse impacts to ground water. For this reason, this impact is less than significant.

**Mitigation Measure WQ-3:** No mitigation is required for this less-than-significant impact. Additional program safeguards that minimize effects on ground water include using licensed pesticide applicators with oversight by county agricultural commissioners. All pesticide label requirements, including those specifically for avoiding adverse impacts to ground water, would be followed. These use modifications are designed to prevent pesticides from reaching ground water at concentrations that would be considered pollution (CalEPA, 1997).

## **5.4 BIOLOGICAL RESOURCES**

This chapter describes the potential impacts to biological resources associated with the proposed PDCP. Several PDCP components typically would not cause changes to the physical environment and thus would not have the potential to cause adverse environmental effects to biological resources. These activities include research, public outreach, and survey and detection efforts. For this reason, the analysis in this chapter focuses only on the contain the spread and rapid response elements of the PDCP.

### **5.4.1 ENVIRONMENTAL SETTING**

Widespread glassy-winged sharpshooter infestations thus far have occurred primarily in southern California, with limited infestations in some northern California counties. However, CDFG has determined that PDCP activities could potentially occur in every area in which Pierce's disease and/or the glassy-winged sharpshooter is present, or may be present. For this reason, the proposed PDCP covers all of California and the many habitats present within its borders. However, treatment areas would occur mostly frequently in agricultural, urban, parkland, and landscaped areas because these altered habitats are where infestations are most likely to occur.

The following sections provide a general overview of existing biological resources in the state, and the laws, regulations, and policies that govern their protection.

### **BIOLOGICAL RESOURCES IN CALIFORNIA**

The Mediterranean climate and varied topography of California have resulted in a tremendous diversity of plant and animal species in the state. California is one of the most biologically diverse areas in the world, with about 30,000 species of insects, 63 freshwater fishes, 46 amphibians, 96 reptiles, 563 birds, 190 mammals, and 8,000 plants (Steinhart, 1990). Development and other changes to the natural environment resulting from California's rapidly increasing population are now threatening many of these species. On average, over 20 percent of the naturally-occurring species of amphibians, reptiles, birds, and mammals are classified as endangered, threatened, or "of special concern" by agencies of the state and federal governments. Although "special-status species" are present in many habitats in California, the majority of these plants and animals are found in natural plant communities that are rare and/or declining. In general, native habitats support higher biological diversity than agricultural and urban developed lands in California.

Some native habitats can support high plant and wildlife diversity even when limited to small, isolated areas that are surrounded by agricultural or urban development. Depending upon the crop type, management practices, and location, agricultural land can also provide important wildlife habitat for certain species.

## **REGULATORY BACKGROUND**

Many biological resources in California are protected and/or regulated by laws, regulations, and policies. Key regulatory issues are discussed below.

### **Special-Status Species**

Special-status species are defined as plants and animals that are legally protected or that are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. For the purposes of this EIR, special-status species include the following categories: plants and animals listed as state and/or federally threatened or endangered; those considered as candidates for listing as threatened or endangered; species identified by the U.S. Fish and Wildlife Service (USFWS) and/or California Department of Fish and Game (CDFG) as California Species of Special Concern; native birds protected by the federal Migratory Bird Treaty Act (MBTA); and animals and plants listed in the California Natural Diversity Database (CNDDDB).

### **Federal Endangered Species Act (ESA)**

Pursuant to the federal ESA, the USFWS and National Marine Fisheries Service (NMFS) have regulatory authority over projects that may affect the continued existence of federally-listed species or adversely affect their designated critical habitat. Under the ESA, the definition of take includes killing, harming, or harassing. USFWS has interpreted the definition of harm to include significant habitat modification. Consultation under Section 10(a) of ESA would be required if it were determined that the program could affect a federally-listed species.

### **California Endangered Species Act (CESA)**

CESA directs state agencies to not approve projects that would jeopardize the continued existence of an endangered or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of a species. Furthermore, CESA states that reasonable and prudent alternatives shall be developed by CDFG, together with the project proponent and the state Lead Agency, consistent with conserving species, while at the same time maintaining a

project's purpose to the greatest extent possible. If a project will take species that are state-listed threatened or endangered, it will require an incidental take permit from CDFG. A take of a species, under the CESA, is defined as an activity that would directly or indirectly kill or harm an individual of a species.

### **Migratory Bird Treaty Act**

The federal Migratory Bird Treaty Act (MBTA) makes it unlawful to pursue, hunt, take, capture, kill, or possess any migratory birds, or part, nests, or eggs of such migratory birds, which are listed in wildlife protection treaties between the United States and Canada, Mexico, Japan, and the former USSR. MBTA protects almost all avian species that are considered native to California.

### **Sensitive Habitats**

Sensitive habitats include sensitive plant communities listed by CDFG in the California Natural Diversity Database (CNDDDB) and those that have been given specific consideration under the California Fish and Game Code, the Clean Water Act, and/or Section 10 of the Rivers and Harbors Act. Sensitive habitats generally include those that are rare, unique, or that support a high level of endemic or rare plant and/or animal species. Sensitive habitats that are widely distributed in California include riparian woodland and wetlands.

## **5.4.2 THRESHOLDS OF SIGNIFICANCE**

The potential for the proposed project to result in significant environmental effects was analyzed using standards provided in the State CEQA Guidelines. Pursuant to the suggested thresholds in Appendix G of the State CEQA Guidelines, the proposed program would have a significant impact on biological resources if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG or USFWS (State CEQA Guidelines, Appendix G).
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFG or USFWS (State CEQA Guidelines, Appendix G).
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pools, coastal, etc.) through

direct removal, filling, hydrological interruption, or other means (State CEQA Guidelines, Appendix G).

- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites (State CEQA Guidelines, Appendix G).
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan (State CEQA Guidelines, Appendix G).
- Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of a rare or endangered plant or animal (State CEQA Guidelines, Appendix G).

### 5.4.3 ENVIRONMENTAL ANALYSIS

As previously described, two aspects of the PDCP may involve the use of pesticides: 1) the regulatory portion of the contain the spread element, and 2) the rapid response element. The PDCP could also include host plant removal and release of non-native biological control agents. Host plant removal could include, but is not limited to, the removal of unmaintained cropland, roadside vegetation, etc. The goal of the biological control aspect of the PDCP is to find and release natural enemies of the sharpshooter that would help reduce the need for pesticide treatments by reducing population levels of the glassy-winged sharpshooter.

Prior to shipment of host plants (nursery stock) outside of the infested areas, growers would be required to comply with measures to ensure the shipments are free of glassy-winged sharpshooters. Growers may comply by conducting an intensive visual search of the shipment or by treating the shipment with an appropriate pesticide or other effective method.

Under the rapid response aspect of the PDCP, when new infestations are found in non-agricultural areas, county agricultural commissioners would contract with licensed pesticide applicators to treat infested non-agricultural areas. Pesticides may be applied to the foliage of trees and shrubs, or to soil immediately below trees and shrubs, using ground application equipment. Open areas, such as grassy areas or open fields, would not be targeted for treatment because they do not contain

suitable glassy-winged sharpshooter habitat. Detection and delimitation efforts would provide information on the location and severity of new glassy-winged sharpshooter infestations so that pesticide applications can be targeted where they would be needed.

CDFR has evaluated a number of registered pesticides for use in the rapid response element of the PDCP. Under the emergency program, carbaryl, imidacloprid, and cyfluthrin have been used for treating non-agricultural areas. An evaluation of the active ingredients and their potential effects on wildlife and plant species is provided in Appendix P. It is likely that the use of these particular pesticides would continue for non-agricultural areas under the proposed PDCP; however, as new information about the effectiveness of different pesticides against the glassy-winged sharpshooter becomes available, other registered pesticides may be used.

All pesticide applications must be in compliance with federal and state laws and regulations. The U.S. EPA and CDPR consider the potential exposure of plants and wildlife to pesticide residues when evaluating a pesticide proposed for registration. Pursuant to FAC section 12825, CDPR may refuse to register any pesticide: "(a) That has demonstrated serious uncontrollable adverse effects either within or outside the agricultural environment; (b) The use of which is of less public value or greater detriment to the environment than the benefit received by its use; (c) For which there is a reasonable, effective, and practicable alternate material or procedure that is demonstrably less destructive to the environment; (d) That, when properly used, is detrimental to vegetation, except weeds, to domestic animals, or to the public health and safety."

Pesticide labels indicate if the material is hazardous to specific animals and include application restrictions to minimize potential impacts to non-target species. The pesticide regulatory program has been certified as meeting the requirements of CEQA (State CEQA Guidelines Section 15251 [i], AB 3765).

Under the rapid response aspect of the PDCP, the local county agricultural commissioner may require growers to use pesticides to control the glassy-winged sharpshooter on cropland and in nurseries. The application of pesticides on agricultural land would be conducted by private growers or owners and would not be funded by the state or the county. Growers could use any pesticide registered and approved for use on the commodity to be treated. Commercial agricultural crops may be treated by aerial application if this is allowed in the area. Because this use of

pesticides by growers may be a part of the PDCP, the potential hazard implications of this action are analyzed in this chapter.

Growers could also choose to apply pesticides based on their own determinations. These activities are not a part of the PDCP. The use of pesticides by private growers to control the glassy-winged sharpshooter on their own accord is covered under the CDPR pesticide regulatory program and is not subject to analysis in this EIR.

For all program activities, pesticides would be applied according to label requirements by a licensed pesticide applicator. All pesticide applications must be in compliance with federal and state laws and regulations, as described previously. Pesticide use in the PDCP would vary spatially and temporally in response to a large number of variables, including the extent of the glassy-winged sharpshooter infestation in an area, weather, presence of endangered or threatened species, and previous control efforts at a specific site.

The PDCP includes an environmental monitoring component that is arranged for by CDFA and conducted by CDPR to verify proper application of the treatments. CDPR conducts monitoring of selected treatments to provide information on the concentrations of the chemicals in surface, irrigation, and storm runoff water, turf, soil, and air. In the event that ecologically sensitive areas are present, toxicity to aquatic organisms would also be determined in surface water. Monitoring of applications by CDPR is a key control component for ensuring that treatments are applied according to pesticide label requirements and thus avoid significant adverse impacts to sensitive biological resources.

CDFA has established procedures for the PDCP to identify and avoid adverse impact to sensitive biological resources in proposed treatment areas. Some of these procedures have been developed specifically for the proposed PDCP and others apply to all of CDFA control and eradication programs.

As described in Chapter 4, CDFA has established communication procedures with resource agencies that provide the earliest possible notice to these agencies prior to implementation of control and eradication programs for non-native pest outbreaks. The established communication procedures enable these agencies to provide input into the activities conducted for each new infestation area prior to treatment.

CDFA has Memoranda of Understanding (MOUs) with both the California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service (USFWS). CDFA has used the process described in the MOU with CDFG and USFWS to address potential impacts to special-status species and sensitive habitats.

Although a formal MOU has not been signed by the two agencies, a similar communication procedure has been agreed to by CDFA and the National Marine Fisheries Service (NMFS) whenever eradication or control activities would encroach on salmonids, marine mammals, ocean coastlines, or streams that empty into the ocean. In a consultation letter dated March 26, 2001 to the USDA (Appendix N), NMFS outlined the recommended consultation process and concluded that the PDCP, as currently formulated, is not likely to adversely affect salmonids or their designated critical habitat protected by the ESA.

Under the communication procedures established by CDFA, when PDCP treatment activities are proposed upon discovery of a new glassy-winged sharpshooter infestation outside of a nursery situation, CDFA would provide the appropriate agencies with maps showing proposed treatment areas and would describe the proposed treatment method, including pesticides to be used. CDFA would then conduct a search of the California Natural Diversity Database (CNDDDB) for special-status species and sensitive habitats previously reported inside or in close proximity to treatment area boundaries and report the results to USFWS and CDFG. NMFS would also be contacted if streams or water bodies that empty into the ocean were present in the treatment area.

If, using this information and prior knowledge of the proposed treatment areas, any of the resource agencies conclude that the proposed PDCP activities pose a potential threat to special-status species or sensitive habitats, the agencies would then develop appropriate mitigation measures to be taken to protect these resources. If the resource agencies determine that implementation of proposed PDCP activities could affect sensitive biological resources, restricting or limiting treatment in these areas is an option. CDFA has altered pest eradication protocols in the past to accommodate requests from CDFG and USFWS concerning listed threatened and endangered species and non-listed species and habitats of concern. CDFA would continue to work with both CDFG and USFWS to avoid "take" of threatened and endangered species and to minimize adverse environmental impacts to other species of concern.

## **PESTICIDES APPLIED IN NON-AGRICULTURAL AREAS**

**Impact Bio-1: The PDCP includes pesticide treatments in non-agricultural areas.**

**Treatments in non-agricultural areas could result in the loss of some non-target invertebrates with temporary effects in treatment areas. Pesticide treatments would not substantially affect any vertebrate species. The U.S. EPA and CDFG consider the potential effects of a pesticide on fish and wildlife when evaluating a pesticide proposed for registration and to determine any use restrictions necessary to ensure that it will not cause unreasonable risks to the environment. As an additional safeguard, existing Memoranda of Understanding (MOUs) and established communication procedures with CDFG, USFWS, and NMFS would ensure that take or other significant impacts to special-status species and sensitive habitats would be avoided. This potential impact is considered less than significant.**

The use of pesticides in non-agricultural areas could result in the loss of non-target invertebrates with temporary effects on some populations in treatment areas. The use of pesticides under the PDCP would not be frequent or widespread enough to result in significant impacts to beneficial insects (see discussion for Impact Bio-3).

The PDCP would not be expected to significantly affect any vertebrate species because the use of pesticides would involve taking all appropriate precautions as specified on product labels and doses would be substantially below toxic levels (Appendix P). The U.S. EPA and CDFG consider potential effects to plants and wildlife during the pesticide registration process and require that appropriate use restrictions be stated on product labels to provide a reasonable certainty of no harm to human health or on the environment with proper application. The pesticide regulatory program has been certified by the Secretary of Resources as meeting the requirements of CEQA (State CEQA Guidelines Section 15251[i]). Environmental monitoring would be conducted by CDFG to verify proper application of the treatments. Impacts to vertebrates are expected to be limited to indirect effects such as a possible reduction in the local food supply for birds and other wildlife species that feed on insects. Indirect impacts on vertebrate species would not be significant. Although pesticide application could result in a temporary change in the composition of local invertebrate populations, this change would not have a significant affect on the existing vertebrate population or wildlife habitat.

Pesticide treatments in non-agricultural areas would not adversely affect any special-status species. The MOUs with CDFG and USFWS have been successfully implemented to avoid take of special-

status species during similar CDFA nonnative pest eradication and control projects. Through the MOU and notification process, CDFA provides information obtained from the CNDDDB to USFWS, CDFG, and, when appropriate, NMFS. The CNDDDB includes reported occurrences of special-status species and sensitive habitats. The agencies, once notified of PDCP treatment activities in non-agricultural areas, would review the CNDDDB list provided by CDFA and use their prior knowledge of the area and other resources to determine if the proposed PDCP activities pose a substantial risk to special-status species or sensitive habitats. CDFA works with CDFG, USFWS, and NMFS to avoid “take” of threatened and endangered species and to minimize adverse environmental impacts to species of concern.

**Mitigation Measure Bio-1:** No mitigation is required for this less-than-significant impact. Additional program safeguards to minimize potential hazards include professional application of registered pesticides and monitoring by CDPR to verify proper application rates and coverage. CDPR monitoring provides information about pesticide residues in the surrounding environment after treatment. The data from environmental monitoring would be reviewed to ensure that applications do not lead to undesirable residue levels. Anomalous results would be evaluated to determine if application methods needed to be adjusted, and if so, the PDCP would require that treatments be modified accordingly. As an additional safeguard, CDFA would notify USFWS, CDFG, and NMFS, when appropriate, of program activities. CDFA will work with these resource agencies to avoid “take” of threatened and endangered species and to minimize adverse environmental impacts to species of concern.

## **PESTICIDES APPLIED IN AGRICULTURAL AREAS AND NURSERIES**

**Impact Bio-2: Pesticide treatments associated with the PDCP would occur in agricultural areas and nurseries. Some agricultural areas provide important habitat for vertebrate wildlife species, including some special-status species. Nurseries are not considered important wildlife habitat. The PDCP is not expected to significantly affect any vertebrate wildlife species because the pesticides used must be in compliance with federal and state laws and regulations, and the pesticides approved for use are most likely already used routinely in agricultural areas and nurseries in California. This impact is considered less than significant.**

The use of pesticides in agricultural areas and nurseries could result in the loss of non-target invertebrates with temporary effects on some populations in treatment areas. Non-target insect re-

colonization and recovery would occur after pesticide treatment ends (see discussion for Impact Bio-3).

Treatments would be conducted by licensed pesticide applicators, in compliance with pesticide label requirements, and with oversight by local county agricultural commissioners. Commercial agricultural crops may be treated by aerial application if this is allowed in the area. Pilots must receive training and have a pest control aircraft pilot's certificate from CDPR. As discussed in Chapter 5.2, application rates and label restrictions provide protective measures to avoid potential adverse impacts to humans and the environment.

As previously discussed, the U.S. EPA and CDPR consider the potential effects to plants and wildlife during the pesticide registration process to ensure that registered products will not cause unreasonable risks to the environment. PDCP pesticide treatments do not pose a significant hazard to vertebrate species because allowable application rates would be substantially below known toxic thresholds. Special-status species that occur in agricultural areas and nurseries are generally limited to vertebrate species. Thus, significant impacts to special-status species or sensitive habitats are not anticipated to result from PDCP treatments applied to agricultural areas or nurseries. This is a less-than-significant impact.

**Mitigation Measure Bio-2:** No mitigation is required for this less-than-significant impact.

## **NON-TARGET INSECTS**

**Impact Bio-3: The use of pesticides in the proposed PDCP would pose risks to non-target insects. Although the PDCP would result in the mortality of some beneficial, non-target insect populations, the impacts would be temporary and limited to the application site. Populations of affected insects would recover through recolonization after treatments; therefore, the temporary loss of non-target insects is considered to be a less-than-significant impact.**

Because the PDCP would involve the use of pesticides, it may pose some risk to non-target insects. Not all insects are equally vulnerable to insecticides. Treatment may result in temporary changes in the composition of local insect populations. Beneficial insect populations in treatment areas could be adversely impacted. Carbaryl is known to be toxic to honeybees and some predacious

mite species that help control pest mites. Other beneficial or desirable species may also suffer temporary population reductions, e.g., ladybird beetles, lacewings, etc. PDCP treatment activities would be targeted to control new glassy-winged sharpshooter infestations. All label restrictions, including specific application measures to reduce impacts to non-target organisms (such as not treating blooming plants or while bees are actively foraging) must be followed. In addition, the PDCP includes provisions to notify commercial beekeepers within the treatment area so that they may take protective action. (See chapter 5.1 for a discussion of potential disruption of commercial bee colonies and pest management programs.) Despite precautions, wild bee populations in treatment areas may suffer temporary reductions.

There is an increased possibility of cumulative effects to insect populations if multiple applications were to be implemented. In most cases, applications in the same physical area would be only once or twice a year, however the number of treatments may vary with local conditions and the material used. The rate of recolonization would depend on several factors, including the population densities of the organisms in nearby untreated areas. Affected insect populations would re-equilibrate after pesticide residues have decreased to nontoxic levels (Appendix P). Because the decrease in insect populations would be temporary and limited to the application site, the impact to the local ecological system would not be significant.

**Mitigation Measure Bio-3:** No mitigation is required for this less-than-significant impact.

## **HOST PLANT REMOVAL**

**Impact Bio-4: Treatment procedures for the PDCP include the removal of vegetation that serves as a potential host for the glassy-winged sharpshooter or as a source of inoculum for the Pierce's disease bacterium. Vegetation removal would typically occur on unmaintained cropland, roadside vegetation, and other areas near an infestation. The PDCP does not allow the removal of any sensitive habitats or special-status plants. Therefore, this is considered a less-than-significant impact.**

To reduce the spread of the glassy-winged sharpshooter and Pierce's disease, vegetation that serves as a potential host may be removed as part of the treatment procedures for the PDCP. Vegetation removal could occur on unmaintained cropland, from along roadsides, and elsewhere in proximity to infestations or vulnerable resources. The PDCP does not involve the removal of special-status

plants or vegetation associated with sensitive habitats, such as riparian vegetation, wetlands, or native vegetation supporting special-status wildlife. For this reason, host plant removal would not result in a significant environmental impact.

**Mitigation Measure Bio-4:** As a safeguard, implementation of the PDCP would not include the removal of sensitive habitats or special-status plants. No mitigation is required for this less-than-significant impact.

### **RELEASE OF NON-NATIVE BIOLOGICAL CONTROL AGENTS**

**Impact Bio-5: Non-native natural enemies of the glassy-winged sharpshooter could be released under the biological control aspect of the PDCP. Prior to the importation and release of natural enemies, CDFA evaluates them for the potential to cause adverse impacts in the state. Natural enemies would be released only after evaluation determined that the release would meet the CDFA criteria regarding reasonable avoidance of harm to beneficial, non-target organisms and the environment. Therefore, no significant impacts are anticipated.**

The goal of the biological control aspect of the PDCP is to find and release effective natural enemies of the glassy-winged sharpshooter. It is anticipated that the release of natural enemies of the sharpshooter would help reduce the need for pesticide treatments. Non-native wasps *Gonatocerus ashmeadi* (ex. [“from”] Mexico), *Gonatocerus triguttatus* (ex. Mexico), and *Gonatocerus morrilli* (ex. Mexico) parasitize glassy-winged sharpshooter eggs. Several other imported glassy-winged sharpshooter natural enemies are currently in quarantine, undergoing evaluation before being considered for release in California. At present, scientists are not able to continuously mass rear glassy-winged sharpshooter natural enemies for release. As part of the PDCP, releases of parasitic wasps would occur to determine if they can survive after release and significantly reduce glassy-winged sharpshooter populations. Research would continue to locate natural enemies and improve mass rearing operations. If mass rearing operations can be improved and trial releases of natural enemies show that they are reducing glassy-winged sharpshooter numbers, biological control agents could be released to reduce new glassy-winged sharpshooter populations throughout the state. Please refer to Chapter 4 for more information about the biological control program.

Prior to the importation and release of non-native biological control agents, CDFA would evaluate their potential for causing harm in the state. CDFA guidelines for evaluation are provided in Appendix J. The guidelines include determining whether a non-native biological control agent could attack non-pest organisms, such as native insects. The USDA Animal and Plant Health Inspection Service (APHIS) has the authority to regulate the movement of plant pests into the U.S. and within the U.S. if they cross state boundaries. USDA has noted that natural enemies of insects are not considered plant pests and thus are not subject to regulation under their authority. If approved for introduction into the state, biological control agents would be screened at a quarantine facility prior to their release. All future permit requests for the importation of natural enemies of the glassy-winged sharpshooter would be subjected to review by CDFA. Adherence to these guidelines provides reasonable assurance that beneficial non-target organisms and the environment would not be adversely affected by the release of non-native biological control agents.

**Mitigation Measure Bio-5:** CDFA would evaluate foreign biological control agents prior to importation and release in California. An important phase in assessing the suitability of a new biological control agent is determining whether it could attack non-pest organisms, such as native insects, or cause harm to the environment. With these program safeguards, the potential for adverse environmental impacts would be less than significant, and no mitigation is required.

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## **6.0 OTHER ENVIRONMENTAL ISSUES**

This chapter addresses the following CEQA-required topics: significant irreversible environmental changes that would be involved in the proposed program should it be implemented, and growth-inducing impacts.

### **6.1 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES**

CEQA requires that an EIR describe “Significant Irreversible Environmental Changes Which Would be Caused by the Proposed Project Should it be Implemented” (State CEQA Guidelines Section 15126.2 (c)). “Significant irreversible environmental changes” include the use of nonrenewable natural resources during the initial and continuing phases of a program, should a program result in the unavailability of these resources in the future. “Significant irreversible environmental changes” also includes primary impacts and, particularly, secondary impacts that generally commit future generations to similar uses, and irreversible damage that can result from environmental accidents associated with a project. Irretrievable commitments of these resources are required to be evaluated in an EIR to assure that such current consumption is justified. (State CEQA Guidelines Section 15126.2(c)).

Natural resources include minerals, energy, land, water, forestry, and biota. Nonrenewable resources are those resources that cannot be replenished by natural means, including oil, gas, and iron ore. Renewable natural resources are those resources that can be replenished by natural means, including water, lumber, and soil.

The proposed PDCP would use minor amounts of both renewable and nonrenewable natural resources for program implementation. Host plants (renewable natural resources) would be used in the mass-rearing operations for biological control agents. Oil and gas would be used by growers to run equipment necessary to treat agricultural fields. This use of non-renewable resources would be within normal agricultural operations, and would not result in a significant increase in the use of existing resources. Pesticide treatments in non-agricultural areas would be made by ground crews, and thus would use human labor rather than non-renewable resources.

The proposed PDCP would not noticeably increase the overall rate of use of any natural resource, or result in the substantial depletion of any nonrenewable natural resource.

As discussed in Chapter 5.1 (Agriculture and Land Use), the use of pesticides could cause disruptive effects and potential economic losses for organic farms, commercial bee colonies, and farm pest management programs. However, the effects of this disruption would be temporary.

Pesticide labels may contain requirements restricting the use of treated areas for a certain period of time. For example, the labels on Merit® 75 WP and WSP include requirements that food crops not be planted for one year following the application. Such pesticides would be used to treat ornamental plants and other plants in public areas, such as parks and highway right-of-ways, as allowed by the label. The label requirements of some pesticides could restrict land uses temporarily, but would not result in significant irreversible environmental change.

In addition, the proposed PDCP is not anticipated to result in irreversible damage from environmental accidents, such as an accidental spill of pesticides. While it is possible that an accident could occur within the PDCP, the program would not result in a substantial increase in accident risk. In the State of California, the storage and use of hazardous substances are strictly regulated and enforced by various local and regional agencies. The enforcement of these existing regulations would preclude credible significant program impacts related to environmental accidents.

## **6.2 GROWTH INDUCING IMPACTS**

An EIR must discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly in the surrounding environment. Included in this are projects that would remove obstacles to population growth. In addition, increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects (State CEQA Guidelines 15126.2(d)).

The PDCP would not have any direct or indirect effect on inducement of additional population growth in California. While a successful program would help maintain the viability of the state's agricultural industry, it would not stimulate significant additional growth in the industry.

## **7.0 CUMULATIVE IMPACTS**

Cumulative impacts refer to two or more individual effects that, when considered together, are considerable or that compound or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time (State CEQA Guidelines 15355).

As previously described, two aspects of the PDCP include the use of pesticides: 1) the regulatory portion of the contain the spread element, and 2) the rapid response element. It is anticipated that small infestations of glassy-winged sharpshooters would continue to appear outside of the generally infested areas of the state. This would result in multiple pesticide applications under the PDCP in the contain the spread and rapid response elements, although not necessarily in the same location.

How many glassy-winged sharpshooter infestations will be found in the future cannot be predicted, nor how many areas would be treated with pesticides under the proposed PDCP. PDCP detection and delimitation activities would provide information on the location and severity of new glassy-winged sharpshooter infestations so that pesticide applications can be targeted where they are needed.

An analysis of the potential environmental effects of the use of pesticides in the PDCP was included in Chapter 5. Because multiple pesticide treatments would occur in a treatment area, and multiple glassy-winged sharpshooter infestation areas would be treated, the analysis of potential environmental effects from the use of pesticides in Chapter 5 considers the potential for multiple applications of pesticides to control the glassy-winged sharpshooter. Thus, the potential cumulative effects from multiple applications of pesticides applied under the proposed PDCP have been addressed in Chapter 5.

The analysis of cumulative effects in this chapter considers implementation of the PDCP in combination with other projects, including the past, present, and anticipated future use of pesticides by other state and local jurisdictions and private growers and homeowners.

## 7.1 PESTICIDE USE IN CALIFORNIA

Pesticides are used throughout the State of California by state and local jurisdictions and private growers and homeowners for agriculture, pest control around buildings and structures, landscape maintenance, public health, and sanitation. California requires reporting of all commercial pesticide use, including amounts applied and types of crops or places (e.g., structures, roadsides) treated. Agricultural and commercial applications, including those for production agriculture, structural fumigation, and urban structural (e.g., termite control) and landscape applications, must be reported by pesticide applicators and growers to local county agricultural commissioners. CDPR compiles the data into a pesticide use report for each year. Pesticide use reports are posted on the internet at <http://www.cdpr.ca.gov/docs/pur/purmain.htm>. The most recent year for which pesticide use data are available from CDPR is 2000.

Reported pesticide applications cover only a portion of the pesticides sold in California each year. Typically, about two-thirds of the pesticide active ingredients sold in a given year are not subject to use reporting. Examples of non-reported uses are chlorine for municipal water treatment, and home and garden use pesticide products used by homeowners (CDPR, 2000c).

As summarized in Table 7-1, there were over 187 million pounds of pesticide active ingredient reported used in California in 2000 (CDPR,2000c). The most recent pesticide active ingredient sales data available at the time this Draft EIR was printed was for the year 1999. The total amount of pesticides sold in 1999 was approximately 706 million pounds of active ingredients. Based on a fractional estimate of 2/3 of the amount of pesticides sold (CDPR, 2000c), it is estimated that residential uses accounted for approximately 470 million pounds of pesticide active ingredients in 1999.

Reported use has varied from year to year since full use reporting was implemented in California in 1990, ranging from approximately 153 million pounds in 1991 to 214 million pounds in 1998.<sup>1</sup> Such variances are, and will continue to be, a normal occurrence. These fluctuations are attributed

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<sup>1</sup> Under full use reporting, California became the first state to require reporting of all agricultural pesticide use, including amounts applied and types of crops or places (e.g., structures, roadsides) treated. Commercial applications - including structural fumigation, pest control, and turf applications - must also be reported. The main exceptions to full use reporting are home and garden applications by homeowners, and most industrial and institutional uses.

to a variety of factors, including changes in planted acreage, crops planted, pest populations, and weather conditions.

**TABLE 7-1: POUNDS OF PESTICIDE ACTIVE INGREDIENTS  
USED IN CALIFORNIA IN 2000**

Use	Pounds of Active Ingredients
Production Agriculture	172,145,719
Postharvest Fumigation	2,134,714
Structural Pest Control	5,164,844
Landscape Maintenance	1,395,421
All Other Reported Use <sup>a</sup>	6,726,235
<b>Total Reported Use</b>	<b>187,566,933</b>

<sup>a</sup> Included in "All Other Reported Use" are pesticide applications reported in the following general categories: pest control on right-of-ways; public health, which includes mosquito abatement work; vertebrate pest control; fumigation of nonfood and non-feed materials, such as lumber, furniture, etc.; pesticides used in research; and regulatory pest control used in ongoing control and/or eradication of pest infestations.

Note: In 1999, approximately 706,000,000 pounds of pesticide active ingredients were sold in California. The data include residential uses, which are approximated by CDPR as two-thirds of pesticides sold in any given year, or 470 million pounds in 1999. Sales data for 2000 were not available at the time this Draft EIR was printed.

Source: CDPR, 2000c

In 2000, the greatest pesticide use reported was in California's San Joaquin Valley. Fresno, Kern, Tulare, San Joaquin and Madera counties in this region reported the highest pesticide use of all the counties in the state.

It should be noted that the pounds of pesticides used and the number of applications are not necessarily accurate indicators of the extent of pesticide use or, conversely, the extent of use of reduced-risk pest management methods. For example, farmers may make a number of small-scale "spot" applications targeted at problem areas rather than one treatment of a large area. They may replace a more toxic pesticide used at one pound per acre with a less hazardous compound that must be applied at several pounds per acre. Either of these scenarios could increase the number of applications and amount of pounds used without indicating an increased reliance on pesticides (CDPR, 2000c).

## 7.2 COMPARISON OF PROGRAM USE OF PESTICIDES RELATIVE TO OVERALL USE OF PESTICIDES IN CALIFORNIA

Appendix U provides a summary of the amount of pesticide used in the emergency program for the year 2000 and 2001 in the counties of Butte, Contra Costa, Fresno, Sacramento, Santa Clara, and Tulare (non-agricultural treatments only). As noted previously, it is difficult to predict the number of areas that may be treated with pesticides in the proposed PDCP. Table 7-2 provides a comparison of the emergency program's use of carbaryl, imidacloprid, and cyfluthrin (the active ingredients in pesticides used in non-agricultural areas in 2000), and the total reported use of those pesticide active ingredients in California in 2000. The total pounds of carbaryl applied in non-agricultural areas under the emergency program in 2000 represent less than one-half of one percent of the total reported use of carbaryl in California in 2000.

**TABLE 7-2: POUNDS OF PESTICIDE ACTIVE INGREDIENTS USED IN THE EMERGENCY PROGRAM AND THE STATE OF CALIFORNIA**

Active Ingredient	Amount of Pesticide Used		Percent of Use by Emergency Program
	Emergency PDCP (non-agricultural areas only), 2000 <sup>a</sup>	Total Reported Used in California in 2000 <sup>b</sup>	
Carbaryl	1,507 lbs.	364,968 lbs.	0.4 %
Imidacloprid	289 lbs.	101,410 lbs.	0.3 %
Cyfluthrin	27 lbs.	27,083 lbs.	0.1 %

<sup>a</sup> Source: Stacie Oswald, CDFG, email correspondence March 15, 2001

<sup>b</sup> Source: CDPR, 2000c

## 7.3 ENVIRONMENTAL ANALYSIS

The following sections provide a discussion of potential cumulative effects for each of the environmental topics examined in this EIR. Where applicable, these analyses indicate how cumulative conditions have been considered in this EIR for each of the environmental impacts.

### 7.3.1 AGRICULTURE AND LAND USE

A cumulative impact could be anticipated if there were an anticipated potential disturbance of existing land uses that could, in combination with other potential effects, result in a larger cumulative land use disturbance. In addition, if there were a current or planned physical division of a community that would be exacerbated by the proposed project, a potential cumulative impact might occur. Similarly, a cumulative impact would occur if implementation of the PDCP were to

result in a conversion of farmland to non-agricultural use, that collectively with the conversion of farmland resulting from other projects would result in a significant impact.

As discussed in Chapter 5.1, no significant environmental agriculture or land use impacts have been identified for the proposed PDCP. The inconvenience associated with agricultural inspection and shipment regulations and ground crew access for application of pesticides in non-agricultural areas would be program-specific, and would not be exacerbated by other state or local pest control projects. The potential temporary loss of organic certifications and disruption to commercial bee colonies and integrated pest management programs would also be program-specific. These disturbances would result from pesticide use on properties that would otherwise not use the pesticides proposed in the PDCP. Although pesticides would continue to be used in agricultural settings, this would not affect the use of other properties. The PDCP would not result in a conversion of agricultural land to non-agricultural use. The PDCP would benefit the agricultural industry by supporting the economic viability of the state's grape industry and possibly other commodities.

Within the PDCP, greenhouses and laboratory facilities may need to be procured for mass-rearing of biological control agents. It is anticipated that these activities would not result in significant environmental impacts because it is anticipated that the greenhouses and laboratory facilities would be located in agricultural areas, near potential release sites. As described in Chapter 5.1, no significant environmental impacts are anticipated from the development of new facilities associated with the PDCP. Additional environmental review of these facilities would occur when they are proposed for development, as required by Sections 15162 and 15168(c) of the State CEQA Guidelines. The potential cumulative impact of the use and construction of greenhouses and laboratory facilities would be considered during the environmental review.

As there are no other pest control programs or private uses of pesticides proposed that could cause land use disturbances, and there are no existing or anticipated physical divisions, no cumulative impacts would occur.

### **7.3.2 HAZARDS**

The potential cumulative impacts from multiple applications of pesticides in the proposed PDCP were considered in the Hazards analysis in Chapter 5.2 of this EIR. As noted in that analysis, the

U.S. EPA and CDPR consider the chemical characteristics of the active ingredient and potential exposure of people during pesticide application when a pesticide is evaluated for registration. During the registration process, a pesticide's persistence in the environment and whether or not it accumulates in the human body are considered in assessing potential human health impacts. CDPR considers the toxic properties of a chemical and estimates the amount of the chemical that could potentially cause an adverse effect. This includes acute (one time), subchronic (one to three months) and chronic (long-term and lifetime) evaluations. Label restrictions specifying the time period during which additional applications of the pesticide may or may not be made, ensure that human health effects from repeated applications would be less-than-significant.

In addition to pesticides used in the proposed PDCP, the public could be exposed to other pesticides from other agricultural, commercial, industrial, and home use. As noted previously, all pesticides applied by growers and licensed pesticide applicators are reported to county agricultural commissioners and compiled by CDPR in annual pesticide use reports. Current reports can be accessed on the internet at <http://www.cdpr.ca.gov/docs/pur/purmain.htm>.

The most recent pesticide use data available are for the year 2000. As noted previously, in 2000 there were over 187 million pounds of pesticide active ingredients reported used in California (CDPR, 2000c). (The amount of pesticides used in private homes and gardens by homeowners is not included.) The use of approximately 365 thousand pounds of carbaryl was reported in 2000. In comparison, 1,507 pounds of carbaryl were used in non-agricultural areas under the emergency Pierce's disease control program in 2000, representing less than one-half of one percent of the total amount of carbaryl use reported in California in 2000.<sup>2</sup>

Several federal and state laws are in place to regulate the use of pesticides in California to ensure that human exposure to multiple pesticides and multiple doses does not result in significant cumulative adverse health effects.

The U.S. EPA and CDPR consider potential incompatibilities with other chemicals when evaluating a pesticide proposed for registration. If an incompatibility is found, restrictions are

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<sup>2</sup> The amount of pesticides used by private growers and nursery owners in response to agricultural shipment regulations and rapid response programs for new glassy-winged sharpshooter infestations under the emergency program is not known. How many glassy-winged sharpshooter infestations would be found in the future cannot be predicted, nor the total amount of pesticides that would be applied as part of the proposed PDCP.

placed on the pesticide label to ensure the pesticide, in combination with other pesticides, would be used safely. Label restrictions can include avoiding mixing a pesticide with an incompatible chemical, or avoiding application of a pesticide on areas where an incompatible chemical has been used previously. CDPR's pesticide registration process has been certified as meeting the requirements of CEQA (State CEQA Guidelines Section 15251[i]). County agricultural commissioners evaluate, condition, approve, or deny permits for restricted-use pesticides; certify private applicators; conduct compliance inspections; and take formal compliance or enforcement actions. These measures help ensure that applications of multiple pesticides are conducted according to label restrictions.

In addition to measures that restrict the application of multiple pesticides, several federal and state laws and monitoring programs are in place to ensure human exposure to multiple pesticides will not result in adverse human health impacts. Before a pesticide can be used on a food crop, the U.S. EPA sets a maximum residue – or “tolerance” – allowed on the crop at harvest. CDPR monitors compliance with pesticide laws and helps ensure that pesticide residues are within the established tolerance levels set by the U.S. EPA. CDPR takes produce samples at seaports and other points of entry into the state, packing sites, and wholesale and retail outlets. All samples are analyzed with tests capable of detecting the presence of more than 200 pesticides and pesticide breakdown products. Residues above established tolerance levels are rarely found, and detection of pesticide residues in produce generally are well below established tolerance levels (CDPR, 2001d).

The U.S. EPA has been given a mandate from Congress to develop risk assessment procedures under the Food Quality Protection Act (FQPA) that take into consideration all sources of exposure. The FQPA mandates a single, health-based standard for all pesticides in all foods; provides special protections for infants and children; expedites approval of reduced risk pesticides; creates incentives for the development and maintenance of effective crop protection tools for American farmers; and requires periodic re-evaluation of pesticide registrations and residue tolerances to keep scientific data supporting pesticide registrations up-to-date.

CDPR, under the mandates set forth in the Toxic Air Contaminant Act of 1983 (amended in 1984), monitors pesticides that could be considered toxic air contaminants. CDPR develops appropriate control measures, in coordination with the California Air Resources Board (CARB), to reduce emissions of these pesticides to levels that are protective of public health. Control measures may be implemented through various methods, such as product labeling, applicator training, or

restrictions on use patterns or locations. Carbaryl, a pesticide that would be used in non-agricultural areas in the proposed PDCP, is considered a potential toxic air contaminant by CDPR. Under the proposed PDCP, applications of carbaryl and other pesticides proposed for use in non-agricultural areas would be monitored by CDPR to look for drift and air or water contamination. The data from environmental monitoring would be reviewed to ensure that applications do not lead to undesirable residue levels. Anomalous results would be evaluated to determine if application methods needed to be adjusted, and if so, the PDCP would require that treatments be modified accordingly.

Pesticide label restrictions and the implementation of pesticide monitoring programs by CDPR would ensure that the contribution of the PDCP to public exposure to pesticides would not be considerable, and would not result in significant cumulative adverse health effects.

### **7.3.3 WATER QUALITY**

As discussed in Chapter 5.3, implementation of the proposed program would not result in significant effects to water quality. The potential for localized off-site runoff into surface water is limited, both as to amount and frequency. The U.S. EPA and CDPR consider the potential effects to water quality and aquatic environments when evaluating a pesticide for registration. Potential incompatibilities with other chemicals are also considered during the evaluation. Label restrictions would be added, if necessary, to limit runoff and reduce potential water quality impacts.

In addition to restrictions on the use and application of registered pesticides on or near water bodies, federal and state regulations require identification and monitoring of pesticides with the potential to cause water quality impacts. Water quality standards are set by State and Regional Water Quality Control Boards according to Section 303 of the California Clean Water Act. Regional Water Quality Control Boards adopt Basin Plans that establish water quality objectives, describe implementation programs to achieve these objectives, and describe surveillance and monitoring activities to evaluate the effectiveness of the water quality control program. The Regional Water Quality Control Boards monitor pollution from pesticide runoff into water bodies. Under the proposed PDCP, CDPR would monitor pesticide treatments in non-agricultural areas to ensure that water quality standards are not violated.

In compliance with the Pesticide Contamination Prevention Act, CDPR also monitors ground water for potential contamination by pesticides, and identifies and tracks pesticides with the potential to pollute ground water. The Pesticide Contamination Prevention Act establishes procedures for reviewing and modifying the use of pesticides found in ground water. These use modifications are designed to prevent pesticides from reaching ground water at concentrations that would be considered pollution (CalEPA, 1997).

Imidacloprid, a pesticide currently used in the emergency program, is listed in CDPR's ground water protection list under CCR, Title 3, Section 6800(b). Imidacloprid has physical-chemical properties, such as long half-life, high water solubility, and low soil absorption, that make it a potential leacher. During PDCP pesticide treatment, licensed pesticide applicators must follow all pesticide label requirements, including those to specifically avoid impacts to ground water.

Because all pesticide label requirements would be followed, potential runoff from agricultural production areas where other pesticides are commonly used would not be considerably altered by PDCP pesticide uses. Pesticide label restrictions and the implementation of pesticide monitoring programs by CDPR would ensure that the contribution of the PDCP to water quality effects from pesticides would not result in significant cumulative water quality impacts.

#### **7.3.4 BIOLOGICAL RESOURCES**

The potential cumulative impacts from multiple applications of pesticides under the proposed PDCP were considered in the biological resources analysis in Chapter 5.4 of this EIR. The U.S. EPA and CDPR consider the potential exposure of plants and wildlife to pesticide residues when evaluating a pesticide proposed for registration. This information is used to determine whether the pesticide will be registered and to define any use restrictions necessary to ensure that they will not cause unreasonable risks to the environment. The pesticide regulatory program has been certified as meeting the requirements of CEQA (State CEQA Guidelines Section 15251 [i]). As an additional safeguard, a communications protocol has been established to inform USFWS, CDFG, and NMFS of program activities and to develop measures to avoid adverse impacts to threatened and endangered species and other species of special concern to resource agencies.

As described in Chapter 5.4, PDCP control methods may also include the removal of vegetation that serves as a potential host for the glassy-winged sharpshooter or as a source of inoculum for the

Pierce's disease bacterium. Vegetation removal could occur on unmaintained cropland, from along roadsides, and elsewhere in proximity to infestations. The PDCP does not allow the removal of any sensitive habitats or special-status plants, and thus the program's host plant removal activities would not cumulatively contribute to the loss of these protected resources.

The proposed PDCP would result in the mortality of non-target beneficial insects; however, the impacts would be temporary and limited to application sites. Applications to a specific area under the PDCP would typically be limited to, at most, three times per year. In most cases, applications in the same physical area are expected to be only once or twice a year. Populations of affected organisms would recolonize the area after pesticide residues have decreased to nontoxic levels (Appendix P). The use of pesticides under the PDCP, alone and in combination with other pesticide use, would not be frequent or widespread enough to result in significant impacts to beneficial insect populations. Re-colonization and recovery would occur after pesticide treatment ends. The use of pesticides in California by private growers and pesticide applicators could also result in effects to non-target species. Like the pesticide applications for the proposed PDCP, these impacts would be temporary and insect population levels would re-establish from surrounding untreated areas. The temporary loss of non-target species as a consequence of the use of pesticides in the proposed PDCP would not result in an overall considerable change in populations of these organisms. Therefore, considering the limited application area and the temporary nature of potential effects, the PDCP would not result in a considerable contribution to cumulative biological effects.

## 8.0 ALTERNATIVES

The PDCP, as proposed, has been described and analyzed in the previous chapters with an emphasis on potentially significant impacts and program safeguards to avoid these impacts. The State CEQA Guidelines require the description and comparative analysis of a range of reasonable alternatives that have been developed to avoid or substantially lessen one or more of the significant effects identified for the project analyzed in the EIR (State CEQA Guidelines Section 15126.6(c)).

Although no significant impacts have been identified for the PDCP (when considering the additional safeguards that would be implemented with the program), the following discussion is intended to inform the public and decision-makers of project alternatives that could be implemented and the positive and negative aspects of those alternatives. This chapter also includes an analysis of the No Project Alternative, as required by the State CEQA Guidelines (Section 15126.6(e)).

As described in Chapter 5, the proposed PDCP incorporates a number of methods that have been shown to be effective at controlling the spread of the glassy-winged sharpshooter and *Xylella fastidiosa*, the bacterium that causes Pierce's disease. A description of control methods that have been evaluated by CDFA for their effectiveness against Pierce's disease and the glassy-winged sharpshooter is provided in Section 8.1 below. In addition, CDFA has examined a number of program alternatives for dealing with the problems caused by the glassy-winged sharpshooter's transmission of the pathogen *Xylella fastidiosa*, a bacterium. These alternatives use different combinations of control methods to slow the spread of the glassy-winged sharpshooter and *Xylella fastidiosa*. Four alternatives were selected for analysis in this EIR and are described beginning with Section 8.2 (page 8-13). Two alternatives were considered but withdrawn from further analysis because it was determined that they were either infeasible or would not avoid or lessen the potential environmental impacts of the proposed PDCP. A short description of alternatives withdrawn from consideration is provided in Section 8.6 with a discussion of why they were withdrawn.

The four alternatives that are compared in this chapter are the following:

- No Project Alternative;
- Alternative A: Regulate the movement of commodities that may carry the glassy-winged sharpshooter but do not take any action against glassy-winged sharpshooter infestations;

- Alternative B: Regulate the movement of commodities that may carry the glassy-winged sharpshooter and abate new glassy-winged sharpshooter infestations on agricultural lands, using the most effective treatments available; and
- Alternative C: Regulate the movement of commodities that may carry the glassy-winged sharpshooter and abate all infestations of glassy-winged sharpshooter outside of the generally infested areas, but do not use conventional pesticides in non-agricultural areas.

The potential environmental effects of the alternatives were analyzed for both the short and long-term. Each alternative is analyzed for its effectiveness at slowing the spread of the glassy-winged sharpshooter and *Xylella fastidiosa*.

It is noteworthy that several of the PDCP components would not have the potential to cause adverse environmental effects, and would likely be implemented independent of the PDCP should this EIR not be certified or the proposed PDCP, as described in this EIR, not be approved. These activities include research, public outreach, and survey and detection efforts. Included in these activities are the survey efforts that are funded by the USDA Animal and Plant Health Inspection Services (APHIS). These activities typically would not cause changes to the physical environment. Thus, it is anticipated that these activities would continue if this EIR is not certified or the proposed PDCP, as described in this EIR, is not approved.

## 8.1 ALTERNATIVE CONTROL METHODS

CDFA has examined a number of methods for controlling the spread of the pathogen *Xylella fastidiosa* and the glassy-winged sharpshooter. Each method is discussed below along with an evaluation of its possible effectiveness, strengths, and weaknesses and the potential environmental impacts of its use. Research on alternative control methods continues to occur. A summary of research activities that have been funded by CDFA and other sponsors is provided in Appendix T.

Methods that have been shown to be effective against the spread of *Xylella fastidiosa* or the glassy-winged sharpshooter have been incorporated into the proposed PDCP. The PDCP also incorporates a research component that includes the study and development of other control measures. Should one or more of these other methods prove effective at significantly lowering glassy-winged sharpshooter numbers, their use could be incorporated into the PDCP in the future.

If a new method is added to the PDCP in the future, additional environmental review would be conducted if significant new environmental impacts are anticipated.

At this time, many of the alternatives discussed here are, for the most part, unproven methods that have been suggested or promoted by interested parties. Data on efficacy are lacking, and they are therefore not yet suitable for general application. Those that are deemed to have merit, may be evaluated further as part of the research element of the PDCP.

### **8.1.1 ALTERNATIVE CONTROL METHODS AIMED AT *XYLELLA FASTIDIOSA***

#### **HOST PLANT RESISTANCE**

The goal of host plant resistance is to find plants that are able to tolerate or resist infection by *Xylella fastidiosa*, and then transfer the genetic basis (genes) of this tolerance or resistance to desirable crop plants using either conventional breeding or more modern genetic engineering techniques.

There are *Vitis vinifera*<sup>1</sup> varieties that die more slowly when infected with *Xylella fastidiosa* than others (Goodwin and Purcell 1992, Varela et al., 2001), but there are no *Vitis vinifera* varieties that are tolerant or resistant to infection by *Xylella fastidiosa* (Kamas et al., 2000, Varela et al., 2001).

There are species of grapes in the southeastern United States that are tolerant or resistant to infection by *Xylella fastidiosa* (Kamas et al., 2000), but to date no one has successfully transferred that tolerance or resistance to *Vitis vinifera*. Researchers at the University of Florida have announced that they have isolated the genes responsible for tolerance or resistance to *Xylella fastidiosa*, but isolating the genes is only the first step in successfully utilizing them. Based on experiences in other plants, it is likely to take five to ten years or more before these genes could be actually integrated into the genetic material of *Vitis vinifera*. Breeding or developing tolerant or resistant varieties of *Vitis vinifera* may eventually solve the Pierce's disease problem.

Although breeding tolerant or resistant *Vitis vinifera* varieties could eventually take care of Pierce's disease, it is possible that the resulting grapes or grape products may not be accepted by consumers or producers. Development of raisin or table grape varieties by classic breeding has been done, and

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<sup>1</sup> the grape grown commercially in California

new varieties of table grapes have been successfully marketed. It is likely that the insertion of genetic material from other species into *Vitis vinifera* varieties used to make wine would encounter some problems of public acceptance as this may be viewed as adulterating the varietal “purity” of the resulting wine. It is unclear how serious this might be, but preliminary discussions with grape breeders suggest that it could be extensive, especially in export markets.

## VINE MANAGEMENT PRACTICES

A number of vine management practices are available to growers to help them potentially reduce the impact of Pierce's disease in their vineyards. Goodwin and Purcell, 1992; Purcell pers. comm. and Kamas et al., 2000, advocate the removal of infected vines from the vineyard as a method to reduce “within vineyard” transmission of *Xylella fastidiosa*. This recommendation is based on models of disease transmission, and as yet has no direct field observations to support it. Removing infected vines seems to be a prudent measure that may help to reduce the transmission of the pathogen within infected vineyards, but the removal of infected vines would not stop the transmission of *Xylella fastidiosa* into the vineyard from elsewhere by vectors such as the glassy-winged sharpshooter.

Removing non-cultivated hosts of *Xylella fastidiosa* from within and around the vineyards works when addressing native vectors because they disperse smaller distances than the glassy-winged sharpshooter, and because native vectors do not breed within vineyards (see Chapter 3 for more information about sharpshooter biology). It is not known if these measures will help reduce the spread of Pierce's disease by the glassy-winged sharpshooter. Existing data indicate that the pattern of spread of *Xylella fastidiosa* by the glassy-winged sharpshooter differs markedly from that of native vectors (see Appendix B).

Pruning of vines has been an effective indirect method of limiting Pierce's disease in vineyards in situations where the pathogen is transmitted later in the season by native vectors (Pierce, 1892). Native vectors tend to feed on newer growth at the tips of the vines and infect plants at that point. If pruning is done before this infection can move into the older portion of the vines, the infected section is removed. It is unclear if this technique will be as effective with infections spread by the glassy-winged sharpshooter. The glassy-winged sharpshooter feeds on larger, older sections of the vine that are not removed during pruning. It has also been shown to feed on vines in the winter in Temecula (Riverside County). These infections are below the point of pruning.

Some growers in Temecula are trying to prune the pathogen from their vines by removing all runners from infected plants. There are no data to support the effectiveness of this method and it failed to help stem the Pierce's disease problem in southern California last century (Pierce, 1892). The fact that the glassy-winged sharpshooter feeds on the main trunk of the vine during the winter argues against this method having a great impact on the incidence of Pierce's disease.

It has been suggested that only unhealthy, mismanaged vines are susceptible to infection by *Xylella fastidiosa*, and that organic farming techniques, using soil amendments such as worm castings, avoiding the use of synthetic organic chemicals, and proper fertilization practices will maintain healthy vines. At present, there are no data to support such claims, and Pierce (1892) found no basis for such ideas in the 1890s in southern California, long before modern conventional chemicals were available for use.

#### **DIRECT CONTROL OF XYLELLA FASTIDIOSA**

There are data showing that some antibiotics (e.g., tetracycline) can suppress *Xylella fastidiosa* when administered into infected plants (Goheen and Hopkins, 1988). The technique had limited success in the southeast, but was not successful when used in hotspots in California (Goheen and Hopkins, 1988).

There are obvious problems with the delivery of antibiotics, either at periodic intervals or continuously, into large numbers of grapevines. The continuous delivery of antibiotics into producing grapevines raises questions about their potential presence in the harvested grapes and grape products. Continuous exposure of bacteria to antibiotics has frequently resulted in the development of resistance to the antibiotic in the exposed bacteria.

Claims have been made for various "cures" for Pierce's disease in grapevines. The Research Subcommittee of the Pierce's Disease Advisory Task Force (Task Force) evaluate such claims and presents recommendations to the full Task Force. The full Task Force may recommend funding for research of a proposed cure, taking no action with respect to the suggested cure, or notify affected industries for them to consider private investigation.

## TECHNIQUES FOR REDUCING TRANSMISSION BY INFECTED STOCK

*Xylella fastidiosa*-infected cuttings or buds have been suggested as a possible way of spreading the pathogen. It has not been shown that transmission of Pierce's disease from infected cuttings or buds is a significant factor in the spread of *Xylella fastidiosa*. Pierce (1892), and Goheen and Hopkins (1988) noted that infected cuttings or buds do not survive long enough to have vectors transmit the pathogen to uninfected plants. Hot water treatments are effective at killing any *Xylella fastidiosa* in infected grapevines prior to the vines being planted into the field (Goheen and Hopkins, 1988). However, this treatment would not prevent infection of the vines by the glassy-winged sharpshooter or other vectors once they are in the field.

## FEASIBILITY CONSIDERATIONS OF XYLELLA FASTIDIOSA CONTROL MEASURES

The control measures for *Xylella fastidiosa* described above are currently considered infeasible for the following reasons:

1. Transferring tolerance or resistance to *Xylella fastidiosa* has yet to be successfully accomplished for grapevines grown commercially in California;
2. The widespread removal of infected vines would not stop further transmission of *Xylella fastidiosa* in the state;
3. Antibiotics have not been shown to be successful in treating *Xylella fastidiosa* in commercial plantings in California; and
4. Infected nursery stock has not been shown to be a significant factor in the spread of *Xylella fastidiosa*, thus, elimination of infected nursery stock would not effectively control the spread of the disease.

For these reasons, these alternative control measures are not analyzed further in this EIR. CDFA will continue to investigate these potential remedies through the research component of the PDCP. This research effort is a joint effort among CDFA, Caltrans, USDA, UC, affected counties, and industry groups. This effort is coordinated through the Research Subcommittee of the Pierce's Disease Advisory Task Force. There are currently over forty scientists working on more than sixty projects funded by state and federal governments, and private industry (see Appendix T).

## 8.1.2 CONTROL METHODS AIMED AT THE GLASSY-WINGED SHARPSHOOTER

### BIOLOGICAL CONTROL

Biological control involves the use of natural enemies to reduce the population size of a target pest. As described in Chapter 4, releases of biological control agents would be used in the proposed PDCP to lower the number of glassy-winged sharpshooters in infested areas of California. However, the use of natural enemies of the glassy-winged sharpshooter may not always be compatible with the use of pesticides. Therefore, biological control agents would be released in areas in which foliar applications of pesticides were not essential. The goal is to lower glassy-winged sharpshooter numbers to help reduce the potential dispersal of the pest, and reduce the spread of *Xylella fastidiosa*.

At present, there are no data to indicate that complete biological control of the glassy-winged sharpshooter can be achieved using existing known natural enemies. Because only one glassy-winged sharpshooter can infect multiple plants with *Xylella fastidiosa*, glassy-winged sharpshooter populations must be driven almost to extinction, and maintained at very low levels to prevent economic injury to susceptible crops.

In order to rear egg mass parasites of glassy-winged sharpshooters, it is necessary to maintain a colony of egg-laying glassy-winged sharpshooters. Currently, scientists are not able to continuously mass rear the glassy-winged sharpshooter. Thus, they are unable to mass rear egg parasites for use in an inundative release program aimed at increasing the rate of parasitism of egg masses. As part of the proposed PDCP, research would continue to improve mass rearing operations to generate the numbers of natural enemies needed to fully test their ability to be used in inundative releases (Elzen and King, 1999).

Augmentative releases of predators of the glassy-winged sharpshooter would cause temporary local decreases in the numbers of other non-target organisms such as aphids, mealybugs, whiteflies, leafhoppers, mites, etc. (Elzen and King, 1999, Flaherty and Wilson, 1999). These insects are mostly considered pests and also serve as prey for some predator insect species. The localized nature of the releases and the dispersal of glassy-winged sharpshooter predators from the area when the food supply is reduced would make these changes temporary and mostly go unnoticed by most people. Releases of predators are not expected to significantly reduce populations of glassy-winged sharpshooters because they feed on other prey and disperse to other areas.

## **MASS TRAPPING**

Mass trapping involves the use of a large number of traps to eliminate or greatly reduce the population of a pest in the trapped area. Currently, there is no known trap or lure that is sufficiently attractive to the glassy-winged sharpshooter to make this method effective. The yellow sticky trap currently being used in the emergency program is useful for detection but not for population reduction. Research is being conducted on lures for the glassy-winged sharpshooter, but nothing is currently available.

## **TRAP CROPS**

Trap crops are plants that a pest would find attractive enough that they would congregate and remain on them. Trap crops can then be treated with a pesticide to reduce the pest population in an area without treating other plants. There are no data to show that trap crops exist for the glassy-winged sharpshooter, or that treating only the more attractive host plants, like crape myrtle, would significantly reduce glassy-winged sharpshooter numbers. The nature of the glassy-winged sharpshooter to feed and breed on a number of plant hosts makes the effective use of trap crops unlikely.

## **PHYSICAL REMOVAL**

The physical removal of a pest from an area using a vacuum, hand picking, etc., has been suggested as a way to deal with glassy-winged sharpshooter. Physical removal requires that sufficient glassy-winged sharpshooters be removed to effect a reduction in the population of the pest. While vacuuming may have some impact in rows with plants of equal height, it is very unlikely that sufficient numbers of the highly mobile glassy-winged sharpshooter can be captured to effect a significant population reduction. Glassy-winged sharpshooters are easily disturbed and quickly move away from the source of the disturbance. In addition, glassy-winged sharpshooters feed in the tops of trees and shrubs that are difficult to reach and search.

It may be possible to remove sufficient egg masses to effect a population reduction if all the leaves can be effectively searched, such as on potted plants in a nursery setting. However, glassy-winged sharpshooters will readily deposit eggs in leaves in the tops of trees and shrubs, making their discovery difficult at best.

In most cases, it is unlikely that sufficient glassy-winged sharpshooter life stages can be physically removed to effect a reduction in their population. There are no data to support the efficacy of these techniques.

### **FOLIAGE OR HOST PLANT REMOVAL**

Removing all host plants from an area would result in the removal of all glassy-winged sharpshooter egg masses present, and the dispersal of all glassy-winged sharpshooter nymphs and adults from the affected area. However, the dispersal of the glassy-winged sharpshooter from affected properties could result in an expansion of the infested area, and would likely lead to a need for increased pesticide treatments. Removing all host plants would also result in localized reductions in all arthropods that feed on the affected plants, and the dispersal of their natural enemies. These reductions would be localized and last until the removed plants were replaced.

### **BARRIERS**

There are physical and chemical barriers that could be used against the glassy-winged sharpshooter. Physical barriers would be used to surround plants with a screen that would keep the glassy-winged sharpshooter out of vineyards and other cropland. Some may use a sticky film to catch glassy-winged sharpshooters that contact them. CDFA initiated a pilot project in the fall of 2001 to research the effectiveness of constructing screens around nurseries to protect nursery stock from infestation by glassy-winged sharpshooters. It is likely that this study would continue under the proposed PDCP. CDFA would share the results of the project with nursery owners and growers, who may choose to use screens as a control method.

Chemical barriers include antifeedants like neem extracts or repellents like kaolin clay. There are no data to show that antifeedants would reduce glassy-winged sharpshooter population numbers. More likely they would drive the mobile glassy-winged sharpshooter nymphs and adults to other sites to feed. Kaolin clay sprays on grape leaves are being credited with slowing the migration of the glassy-winged sharpshooter into vineyards in Kern County, but data measuring the impact are lacking. As with antifeedants, repellents simply move the mobile glassy-winged sharpshooter nymphs and adults onto untreated plants nearby. The dispersal of the glassy-winged sharpshooter from affected properties could result in an expansion of the infested area and would likely lead to a need for increased pesticide treatments.

### **ELIMINATION OF THE ABILITY OF THE GLASSY-WINGED SHARPSHOOTER TO TRANSMIT *XYLELLA FASTIDIOSA***

In theory, it may be possible to alter either the glassy-winged sharpshooter or the bacterium *Xylella fastidiosa* to prevent the transmission of the bacterium. Such an alteration, if passed into the general population of the vector and/or pathogen, would provide an effective “cure” to the disease problems caused by the pathogen. At this time, achieving such a transformation in either the glassy-winged sharpshooter or the pathogen is at best speculative. Such genetically-altered organisms would undergo review by federal and state governments to determine if they would be allowed to be released into the environment. It is not expected that such organisms would be available for release in the near future, if they can be developed at all.

### **INTERPLANTING OR BORDER PLANTING OF SUSCEPTIBLE CROPS**

The goal of interplanting or border planting one crop in or beside another crop is to increase the complexity of agro-ecosystems and thus preserve the diversity of natural enemies that would maintain pest numbers at acceptable levels. The technique has been used successfully with several crops (Murphy et al., 1998, Nentwig, 1998, Coll, 1998, Helenius, 1998). It is unclear if interplanting or border planting would be successful with the glassy-winged sharpshooter. Glassy-winged sharpshooter nymphs need to feed on many different plants to complete their development, and providing such diversity in plantings of susceptible crops may actually increase overall glassy-winged sharpshooter survival and subsequent numbers of the pest. There are no data to support the efficacy of interplanting to suppress glassy-winged sharpshooter numbers to acceptable levels.

### **MATING DISRUPTION**

The goal of mating disruption is to interrupt signaling between the sexes of the target pest and thus prevent or lower mating and the subsequent production of offspring. The technique has proven successful with insects that produce airborne chemicals that attract the opposite sex (pheromones). Glassy-winged sharpshooters, like other leafhoppers, most likely use acoustic signals transmitted through the plants on which they reside to attract mates (Claridge, 1985). There are no data showing that mating disruption is effective in such instances.

### **AVOID PLANTING SUSCEPTIBLE CROPS IN OR NEAR GLASSY-WINGED SHARPSHOOTER HABITATS**

Another proposed tactic is to avoid the planting of susceptible crops, such as grapevines, in or near leafhopper breeding habitats. It has been suggested that this would lower the incidence of Pierce's disease spread by separating the habitat of vectors from the susceptible crop itself (Goodwin and Purcell, 1992, Kamas et al., 2000). It is unlikely this tactic would prevent the spread of Pierce's disease by the glassy-winged sharpshooter. The glassy-winged sharpshooter breeds in grape vineyards and may breed on other susceptible crops. The glassy-winged sharpshooter also breeds in citrus crops. The breeding of the glassy-winged sharpshooter in several crops, including susceptible crops, makes it impossible to plant susceptible crops in areas away from where the pest breeds.

### **USE STERILE GLASSY-WINGED SHARPSHOOTERS**

The use of sterile insects to reduce or eliminate populations of pest insects has been effective against several species of fruit flies (CDFA 1999, 2000a, b). The goal in a glassy-winged sharpshooter program would be to release sufficient numbers of sterile glassy-winged sharpshooters to attain a high probability of each wild female glassy-winged sharpshooter mating with a sterile male glassy-winged sharpshooter and thus producing non-viable eggs.

At present, mass rearing operations for the glassy-winged sharpshooter have not been successful. The ability to mass rear glassy-winged sharpshooters is necessary to produce the sterile adults needed for release. There are also critical factors in the insect's biology that would influence the success of this method. It is not known if glassy-winged sharpshooter females mate more than once, whether the males mate more than once, whether the refractory period between multiple matings (if they occur) is the same for females mated to sterile or wild males, or whether mass reared glassy-winged sharpshooter males can successfully compete for, and mate with, wild females. It is unlikely that mass rearing of glassy-winged sharpshooter for use in sterile insect releases would be available within the next seven years. Also, sterile glassy-winged sharpshooters would be still capable of spreading Pierce's disease, so releasing large numbers would exacerbate the disease problem.

## INTEGRATED PEST MANAGEMENT (IPM)

The University of California advocates the use of multiple techniques to control pests based on monitoring pest numbers in the field (Flaherty et al., 1992, Flaherty and Wilson, 1999). Growers would use one or more of the techniques described above to manage glassy-winged sharpshooter populations and reduce them to acceptable levels.

Texas A & M University advocates an IPM approach to reducing grapevine death from *Xylella fastidiosa* (Kamas et al., 2000). The IPM program recommends pesticide treatments, buffer zones around vineyards, planting away from areas where the vectors breed, and removal of infected grapevines from vineyards. The trigger for pesticide treatments is one glassy-winged sharpshooter in 25 net sweeps of vegetation in and around a vineyard. Despite these efforts, Texas grape growers have lost millions of dollars to Pierce's disease (Kamas et al., 2000).

The problem facing growers is that a single *Xylella fastidiosa*-infected glassy-winged sharpshooter can itself infect multiple susceptible plants while feeding. Reducing the damage caused by *Xylella fastidiosa* infection of a crop requires that glassy-winged sharpshooter numbers be reduced to levels lower than may be achievable using IPM approaches. Growers who resort to extensive pesticide treatments to reduce glassy-winged sharpshooter numbers may disrupt non-chemical controls already in place for other pests. If research to deal directly with the pathogen is successful, there would be little need for IPM programs aimed at the glassy-winged sharpshooter.

## FEASIBILITY CONSIDERATIONS OF GLASSY-WINGED SHARPSHOOTER CONTROL MEASURES

In summary, the control measures for glassy-winged sharpshooter described in this section are considered infeasible at this time for the following reasons:

1. At this time, complete biological control of the glassy-winged sharpshooter cannot be achieved using natural enemies;
2. There is no known trap or lure that is attractive enough to the glassy-winged sharpshooter to effectively control its spread;
3. There are no known trap crops (crops that the pest would find attractive enough that they congregate and remain on them) for the glassy-winged sharpshooter;
4. Physical or manual removal approaches (e.g., vacuuming or hand-picking) have not been shown to be effective;

5. Removing all host plants from an infested area would only result in localized reductions in glassy-winged sharpshooter, and would not be a feasible approach to controlling the glassy-winged sharpshooter throughout the state;
6. Barriers have not yet been shown to be effective in controlling the spread of the glassy-winged sharpshooter;
7. A genetically-altered glassy-winged sharpshooter that lacks the ability to vector *Xylella fastidiosa* is not available;
8. Mating disruption has not been shown to be an effective control measure for glassy-winged sharpshooter;
9. Because the glassy-winged sharpshooter will breed in multiple crops, the avoidance of breeding habitat is not feasible;
10. Mass rearing operations for the glassy-winged sharpshooter are not yet developed, and releasing large numbers of sterile vectors would increase the risk of disease transmission.

For these reasons, these alternative control measures are not analyzed further in this EIR.

However, as previously noted, CDFA would continue to investigate potential remedies through the research component of the PDCP.

## **8.2 NO PROJECT ALTERNATIVE**

The State CEQA Guidelines (Section 15126.6(e)) require that the No Project Alternative be analyzed in an EIR to allow decision-makers to compare the impacts of approving the proposed project with the impact of not approving the proposed project. If the proposed PDCP were not approved, CDFA would stop the legislatively mandated PDCP, including all regulatory actions, survey, treatment, research, and public outreach of the emergency program. Current regulations would be repealed and containment, control, or other holding action for the glassy-winged sharpshooter could occur only at the discretion of local county agricultural commissioners. Any pesticide use that occurs as a result of the statewide program to control the glassy-winged sharpshooter would be discontinued.

Nursery shipments going to uninfested areas would continue to be required to be free from glassy-winged sharpshooters in accordance with nursery standards of pest cleanliness (CCR Section 3060.2). Shipments staying within the generally infested areas would be required to meet the state standard of “commercially clean.”<sup>2</sup> Detection of the glassy-winged sharpshooter would occur only during routine nursery inspections and any action to control the pest would be at the discretion of local county agricultural commissioners, pending availability of resources. There would be no state-sponsored or coordinated outreach to encourage citizens to report infestations of the pest. It is unlikely that abatement would occur outside a nursery situation, and there would be no coordinated distribution of information on effective treatment methods by the state. The state would not be involved in coordinating research into effective control methods for *Xylella fastidiosa* or the glassy-winged sharpshooter.

### 8.2.1 AGRICULTURE AND LAND USE

Because PDCP-related pesticide treatments would not occur in non-agricultural areas under the No Project Alternative, the inconvenience associated with ground crew activities for application of pesticides in non-agricultural areas would be avoided. Because all required pesticide use associated with the emergency program’s rapid response activities would cease, the potential disruption to commercial bee colonies, pest management programs, and organic farms would be avoided. It is likely, however, that growers would use increasing amounts of pesticides to control the glassy-winged sharpshooter independent of the PDCP. The rearing and release of biological control agents would not occur under the No Project Alternative and therefore greenhouses and other facilities would not be procured for mass-rearing operations. Although these types of effects are probable with implementation of the PDCP, no significant environmental impacts related to land use have been identified for the proposed PDCP.

If no measures were implemented to control the spread of Pierce’s disease and the glassy-winged sharpshooter, it is estimated that between 28,997 to 91,822 acres of grapes would be lost annually in the State of California when glassy-winged sharpshooter spreads throughout the state (Appendix B). These losses could cost grape growers between \$229,749,000 and \$590,648,000 annually in

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<sup>2</sup> Commercially clean means that “pests are under effective control, are present only to a light degree, and that only a few of the plants in any lot or block of nursery stock or on the premises show any infestation or infection, and of these none show more than a few individuals of any insect, animal or weed pests or more than a few individual infestations of any plant disease” (CCR Title 3 Section 3060.2(a)).

crop losses, pesticide application costs, and crop replacement costs. In addition, other crops, including alfalfa and almonds, could be negatively affected by the spread of the glassy-winged sharpshooter and *Xylella fastidiosa*. (See Appendix B for further detail on the projected impacts of Pierce's disease and the glassy-winged sharpshooter in California.) These impacts would ripple through California's economy, leading to significant economic impacts to related trade and tourism sectors.

As a result of the economic losses associated with the spread of Pierce's disease, the No Project Alternative could result in the indirect conversion of farmlands to non-agricultural use. The natural progression would likely be that vineyards impacted by Pierce's disease would be converted to more economically viable uses. If these uses were not agricultural, a conversion of farmland would occur. This would be a significant impact of the No Project Alternative.

### 8.2.2 HAZARDS

Under the No Project Alternative, pesticide use associated with the statewide program to control the glassy-winged sharpshooter would cease. However, without a coordinated statewide program, the glassy-winged sharpshooter and impacts from an increased infection rate of *Xylella fastidiosa* in susceptible plants would spread to new areas of the state. As a result, overall use of pesticides by growers could increase to protect individual properties from the effects of *Xylella fastidiosa*. Although label requirements direct growers to use pesticides in specific ways, private use of pesticides is not monitored to the degree that it would be monitored under the PDCP. Further, the additional safeguards provided by the PDCP that would ensure that pesticides were applied in safe and environmentally sensitive ways would not be provided. However, no significant human health impacts would be anticipated from pesticide residues or spray drifts when registered pesticides are used according to label restrictions.

Without regulations to ensure shipments out of infested areas of the state are free of glassy-winged sharpshooter, other states and countries that did not have glassy-winged sharpshooters and/or *Xylella fastidiosa* may quarantine California products suspected of harboring either organism, with resulting economic impacts. The glassy-winged sharpshooter is currently known to infest the states of Alabama, Arkansas, Florida, Louisiana, Mississippi, Nevada, North Carolina, South Carolina, and Texas. Some importing destinations would likely require certification that the commodity was

free from glassy-winged sharpshooter and/or Pierce's disease, resulting in additional pesticide use, inspection, or diagnostic work prior to shipment.

### **8.2.3 WATER QUALITY**

Under the No Project Alternative, the application of pesticides to control the glassy-winged sharpshooter by the state and counties would cease. However, it is likely that growers would use increasing amounts of pesticides to control the glassy-winged sharpshooter. Private growers would be required by law to follow pesticide label directions to avoid environmental impacts, but would not be required to consult with USFWS, CDFG, or NMFS prior to treating areas in proximity to surface waters. In addition, CDPR would not conduct special monitoring to ensure that pesticides are applied according to label directions to minimize water quality impacts. Overall pesticide use could increase throughout the state and the additional safeguards included in the PDCP would not be implemented. However, measures to mitigate potential water quality impacts are included in pesticide label instructions. Thus, water quality impacts of the No Project Alternative would not be considered significant.

### **8.2.4 BIOLOGICAL RESOURCES**

Under the No Project Alternative, coordinated statewide treatment of new infestations would cease. This could result in an increase in the spread of the glassy-winged sharpshooter and impacts from an increased infection rate of *Xylella fastidiosa* in susceptible plants. It is likely that growers would use increasing amounts of pesticides to control the glassy-winged sharpshooter. Private growers would likely follow pesticide label directions to avoid environmental impacts, but would not be required to consult with USFWS, CDFG, or NMFS, or take additional measures to avoid impacts to threatened and endangered species, sensitive species, and sensitive habitats. Overall, pesticide use could increase throughout the state, and the additional safeguards included in the PDCP would not be implemented.

### **8.2.5 ABILITY TO MEET PROGRAM GOAL**

The overall goal of the proposed PDCP is to minimize the statewide impact of Pierce's disease. The No Project Alternative would result in an increase in new glassy-winged sharpshooter infestations and impacts brought about by increasing infection rates of *Xylella fastidiosa* in susceptible plants. Thus, the No Project Alternative would not meet the goal of the PDCP.

In addition, the No Project Alternative would not be consistent with the Legislative mandates of the Food and Agricultural Code that obligate CDFA to prevent the introduction and spread of injurious insect and animal pests, plant diseases, and noxious weeds (FAC Section 403) and to use all reasonable means to control or eradicate newly discovered pests (FAC Sections 5251 through 5254). Senate Bill 671, which was signed by Governor Davis on May 19, 2000, added Article 8 (commencing with Section 6045) to FAC Division 4, Part 1, Chapter 9. As amended by Senate Bill 671, the Food and Agricultural Code commits the state to combat Pierce's disease and its vectors, and sets forth specific content requirements of local workplans, and requirements for the appropriation of funds to local entities for the implementation of those workplans. With the No Project Alternative, funds could not be appropriated to local entities for the control of Pierce's disease or the glassy-winged sharpshooter, because the appropriation requirements of the Food and Agricultural Code would not be met. Further, because no actions to combat Pierce's disease would continue, the mandates of the Food and Agricultural Code and the legislative intent of Senate Bill 671 would not be met.

### **8.3 ALTERNATIVE A: REGULATE THE MOVEMENT OF COMMODITIES THAT MAY CARRY THE GLASSY-WINGED SHARPSHOOTER BUT DO NOT TAKE ANY ACTION AGAINST GLASSY-WINGED SHARPSHOOTER INFESTATIONS**

Under this alternative, CDFA would regulate the movement of commodities that could carry the glassy-winged sharpshooter (such as nursery stock, bulk grapes, and citrus), but would not take any action against current or future glassy-winged sharpshooter infestations. A detection program would be maintained in areas free of the pest to support the regulations. Commodities would continue to be treated, and commercial premises (such as nurseries) that were found to be infested would be treated at the expense of the owner. As with the proposed PDCP, research, public outreach, and survey work would continue, similar to the efforts being implemented under the emergency program.

Program-related pesticide treatments would be limited to infested commercial premises and would be conducted at the expense of the owner, with a corresponding small reduction in the overall use of required pesticides. Under the state regulatory program, nursery stock and other plant products could continue to move from glassy-winged sharpshooter-infested areas, but only if shown to be free of glassy-winged sharpshooter. This would slow the spread of the pest. However, without

treatment of new infestations in non-agricultural areas, and without coordination of treatments in agricultural areas, the number of new glassy-winged sharpshooter infestations would increase.

Existing and new glassy-winged sharpshooter infestations outside nurseries would be untreated in most counties, leading to continued spread of the pest until it reached all portions of the state in which it can survive. Homeowners, growers, and others would most likely use increasing amounts of pesticides to prevent the impacts brought about by increasing infection rates of *Xylella fastidiosa* in susceptible plants. There would be crop losses as outlined in Appendix B. Other states and countries that did not have either glassy-winged sharpshooter or *Xylella fastidiosa* could impose a statewide quarantine on plants and plant products known or suspected of carrying either organism, with likely requirements that some commodities be treated with pesticides and/or inspected prior to shipping, or not be eligible for import.

### **8.3.1 AGRICULTURE AND LAND USE**

Because PDCP-related pesticide treatments would not occur in non-agricultural areas under this alternative, the inconvenience associated with ground crew access for application of pesticides in non-agricultural areas would be avoided. Because all required pesticide use associated with the emergency program's rapid response activities would cease, the potential disruption to commercial bee colonies, pest management programs, and organic farms would be avoided. However, it is likely that growers would use increasing amounts of pesticides, on their own accord, to control the glassy-winged sharpshooter.

The regulations restricting the movement of commodities out of the infested areas would be the same as those included in the proposed PDCP. However, like the proposed PDCP, these activities would not result in significant environmental impacts associated with agriculture or land use.

Under this alternative, rearing and releases of biological control agents could continue.

Greenhouses and other facilities may be needed for mass-rearing operations, but the construction of these facilities is not expected to result in significant impacts to the environment.

No significant environmental impacts related to agriculture and land use were found for the proposed PDCP. Thus, this alternative would be similar to the proposed PDCP when considering these potential effects.

### 8.3.2 HAZARDS

Under this alternative, pesticide use conducted to qualify shipments for movement out of an infested areas would continue. However, pesticide use associated with the rapid response program would cease. This would result in a decrease in PDCP-related pesticide use. However, without a coordinated statewide rapid response program, it is likely that the glassy-winged sharpshooter and the impacts from an increased infection rate of *Xylella fastidiosa* would spread to new areas of the state. As a result, overall use of pesticides by growers and landowners themselves could increase to protect individual properties from the effects of *Xylella fastidiosa*. However, no significant human health impacts would be anticipated from pesticide residues or spray drifts when registered pesticides are used according to label restrictions.

### 8.3.3 WATER QUALITY

Under this alternative, pesticides would continue to be used by growers to qualify shipments for movement out of infested areas. However, the use of pesticides as part of a rapid response program would not occur. This would result in a decrease in the use of pesticides in the statewide program. However, it is likely that growers would use increasing amounts of pesticides to control the glassy-winged sharpshooter. Private growers would be required by law to follow pesticide label directions to avoid environmental impacts, but would not be required to consult with USFWS, CDFG, or NMFS prior to treating areas in proximity to surface waters. In addition, CDPR would not conduct special monitoring to ensure that pesticides are applied according to label restrictions to minimize water quality impacts. Overall pesticide use could increase throughout the state and the additional safeguards included in the PDCP would not be implemented. However, measures to mitigate potential water quality impacts are included in pesticide label instructions. Thus, water quality impacts would not be considered significant.

### 8.3.4 BIOLOGICAL RESOURCES

Under this alternative, pesticides would continue to be used by growers to qualify shipments for movement out of infested areas. However, the use of pesticides as part of a rapid response program would not occur. It is likely that growers would use increasing amounts of pesticides to control the glassy-winged sharpshooter on their own accord. Private growers would likely follow pesticide label directions to avoid environmental impacts, but would not be required to consult with USFWS, CDFG, and NMFS, or take additional measures to avoid impacts to threatened and endangered

species, sensitive species, and sensitive habitats. Overall, pesticide use could increase throughout the state and the additional safeguards included in the PDCP would not be implemented.

### **8.3.5 ABILITY TO MEET PROGRAM GOAL**

The overall goal of the proposed PDCP is to minimize the statewide impact of Pierce's disease. Regulating the movement of commodities that may carry glassy-winged sharpshooters, when implemented independently from the other elements of the PDCP, would not adequately control the spread of Pierce's disease. Existing and new glassy-winged sharpshooter infestations outside nurseries would be untreated in most counties, leading to continued spread of the pest until it reached all areas of the state where it can survive. Thus, this alternative would not meet the goal of the PDCP. With this alternative, funds would not be appropriated to local entities for the control of Pierce's disease or the glassy-winged sharpshooter. Thus, the legislative intent of Senate Bill 671 and Article 8 of the Food and Agricultural Code would not be met.

## **8.4 ALTERNATIVE B: REGULATE THE MOVEMENT OF COMMODITIES THAT MAY CARRY THE GLASSY-WINGED SHARPSHOOTER AND ABATE NEW GLASSY-WINGED SHARPSHOOTER INFESTATIONS ON AGRICULTURAL LANDS, USING THE MOST EFFECTIVE TREATMENTS AVAILABLE**

Under this alternative, CDFA would maintain regulations that restrict the movement from infested areas of commodities that may harbor glassy-winged sharpshooters, thereby slowing the artificial movement of the glassy-winged sharpshooter statewide. A detection program would be maintained in those areas free of the pest to support the regulations. As with the proposed PDCP, research, public outreach, and survey work would continue, similar to the efforts being implemented under the emergency program.

Only infestations found on agricultural land outside of the generally infested area would be treated as a part of any county's rapid response plan. Treatment would be conducted by the grower and would use the most effective materials available. A uniform glassy-winged sharpshooter detection program would result in more rapid detection of the pest outside established infested areas.

There would be no program-related pesticide treatment on non-agricultural properties infested with the glassy-winged sharpshooter, with a corresponding small reduction in the overall use of required pesticides. Based on historic occurrences, it is estimated that three to five new non-agricultural

(urban) infestations would occur each year. These new, non-agricultural infestations would not be treated. Because treatment would not occur, the number of infestations could rise on an annual basis. Treatment of glassy-winged sharpshooter infestations in agricultural areas would temporarily reduce the spread of the insect and disease, as well as resulting crop death in treated crops.

This alternative would not prevent the build-up and dispersal of the glassy-winged sharpshooter from non-agricultural lands to new areas or nearby crops. The number and size of glassy-winged sharpshooter infestations on non-agricultural lands would continue to increase. Treatments on agricultural lands would have only temporary benefits, since they would be continually reinfested from adjacent infested non-agricultural areas.

While impacts on infested cropland would be slowed, damage to plants caused by *Xylella fastidiosa* in non-agricultural areas would be unabated. The impacts discussed in Appendix B would begin to occur and would continue to increase in severity until either a solution to the problem of dealing with *Xylella fastidiosa* was found or maximum damage had occurred.

Growers would likely use increasing amounts of pesticides to prevent the impacts of increasing infection rates of *Xylella fastidiosa* in susceptible plants. Other states and countries that did not have either glassy-winged sharpshooter or *Xylella fastidiosa* could impose quarantines on plants and plant products known or suspected of carrying either organism, and likely require some commodities be treated with pesticides and/or inspected prior to shipping, or not be eligible for import.

#### **8.4.1 AGRICULTURE AND LAND USE**

Because PDCP pesticide treatments would not occur in non-agricultural areas under Alternative B, the inconvenience associated with ground crew access for application of pesticides in non-agricultural areas would be avoided. Because growers outside of the generally infested areas would be required under the rapid response program to use pesticides to control the spread of the glassy-winged sharpshooter, potential disruption to commercial bee colonies, pest management programs, and organic farms could occur. However, similar to the effects of the PDCP, these effects would not be significant environmental impacts.

Rearing and releases of biological control agents would continue under this alternative. Greenhouses and other facilities may be needed for mass-rearing operations, but the construction of these facilities would not be expected to result in significant impacts to the environment.

The regulations restricting the movement of commodities out of the generally infested areas would be the same as included in the proposed PDCP. Like the proposed PDCP, these restrictions would not result in significant environmental impacts associated with agriculture or land use.

### **8.4.2 HAZARDS**

Under this alternative, pesticide use conducted to qualify shipments for movement out of an infested area would continue. Growers would continue to be required to use pesticides when new glassy-winged sharpshooter infestations were found outside of the generally infested area. However, the counties would not use pesticides in non-agricultural areas. This would result in an initial decrease in conventional pesticide use as a result of the statewide program compared with the proposed PDCP. However, without a comprehensive rapid response program, it is likely that the glassy-winged sharpshooter and the impacts from an increased infection rate of *Xylella fastidiosa* would spread to new areas of the state. As a result, overall use of pesticides by growers could increase to protect individual properties from the effects of *Xylella fastidiosa*. However, no significant human health impacts would be anticipated from pesticide residues or spray drifts when registered pesticides are used according to label restrictions.

### **8.4.3 WATER QUALITY**

Under this alternative, pesticides would continue to be used by growers to qualify shipments for movement out of infested areas. Growers would continue to treat their crops with pesticides as part of the rapid response program. However, no pesticides would be used to treat non-agricultural areas. Initially this would result in a small decrease in the use of pesticides in the statewide program. However, because this alternative would be less effective at controlling the glassy-winged sharpshooter, it is anticipated that the glassy-winged sharpshooter and *Xylella fastidiosa* would spread to new areas of the state. As a result, overall use of pesticides by growers could increase to protect individual properties from the effects of *Xylella fastidiosa*. Private growers would not be required to consult with USFWS, CDFG, or NMFS prior to treating areas in proximity to surface waters. In addition, CDPR would not conduct special monitoring to ensure that pesticides are applied according to label restrictions to minimize water quality impacts.

Overall pesticide use could increase throughout the state, and the additional safeguards included in the PDCP would not be implemented. However, measures to mitigate potential water quality impacts are included in pesticide label instructions. Thus, significant water quality impacts would not be expected to occur.

#### **8.4.4 BIOLOGICAL RESOURCES**

Under this alternative, pesticides would be used by growers to qualify shipments for movement out of infested areas, and in response to finding new infestations. However, no pesticides would be used to treat non-agricultural areas. This would result in an initial decrease in the use of pesticides. However, without a comprehensive rapid response program, it can be anticipated that glassy-winged sharpshooters would spread to new areas of the state. As a result, overall use of pesticides by growers could increase. If pesticides are used independent of the PDCP, private growers would likely follow pesticide label directions to avoid environmental impacts, but would not be required to consult with USFWS, CDFG, and NMFS, or take additional measures to avoid impacts to threatened and endangered species, sensitive species, and sensitive habitats.

#### **8.4.5 ABILITY TO MEET PROGRAM GOAL**

The overall goal of the proposed PDCP is to minimize the statewide impact of Pierce's disease. Abating only infestations of glassy-winged sharpshooter on agricultural lands would not effectively control the spread of Pierce's disease. Although treatment of glassy-winged sharpshooter in agricultural areas would slow the spread of the insect and the disease, the number and size of glassy-winged sharpshooter infestations on non-agricultural lands would continue to increase. Treatments on agricultural lands would have only temporary benefits, since they would be continually reinfested from adjacent infested non-agricultural areas. Thus, this alternative would not meet the goal of the PDCP.

## **8.5 ALTERNATIVE C: REGULATE THE MOVEMENT OF COMMODITIES THAT MAY CARRY THE GLASSY-WINGED SHARPSHOOTER AND ABATE ALL INFESTATIONS OF GLASSY-WINGED SHARPSHOOTER OUTSIDE OF THE GENERALLY INFESTED AREAS, BUT DO NOT USE CONVENTIONAL PESTICIDES IN NON-AGRICULTURAL AREAS**

Under this alternative, CDFA would maintain regulations that restrict the movement of commodities that may harbor glassy-winged sharpshooter such as nursery stock, citrus and grapes from infested areas, thereby slowing the artificial movement of the glassy-winged sharpshooter statewide. A detection program would be maintained in those areas free of the pest to support the regulations. As with the proposed PDCP, research, public outreach, and survey work would continue, similar to the efforts currently being conducted under the emergency program.

As part of the county rapid response, glassy-winged sharpshooter infestations found on agricultural lands outside the generally infested area would be treated with the most effective means available. Glassy-winged sharpshooter infestations on non-agricultural lands would be treated with naturally-occurring pesticides or with non-pesticide options, including biological control or physical controls, as described in the previous alternative control methods section. Based upon historic occurrences, it is estimated that three to five new non-agricultural (urban) infestations would occur each year.

Because all glassy-winged sharpshooter infestations outside the generally infested area would be treated in some manner, the number and spread of new glassy-winged sharpshooter infestations would be slowed. There would be no program-related conventional pesticide treatment on non-agricultural properties infested with the glassy-winged sharpshooter, with a corresponding small reduction in the overall use of these materials and a reduction in possible environmental effects. A uniform glassy-winged sharpshooter detection program would result in more rapid detection of the pest outside known infested areas. A coordinated glassy-winged sharpshooter and *Xylella fastidiosa* research effort should produce results more rapidly.

Based on the lack of efficacy of non-conventional pesticide methods (as noted in the alternative control methods section above), new and existing glassy-winged sharpshooter infestations on non-agricultural lands would continue to increase in numbers and spread, allowing glassy-winged sharpshooters and *Xylella fastidiosa* to move from infested residential areas into adjacent agricultural lands.

Based on available data, the use of non-conventional pesticide alternatives in this alternative would not effectively lower glassy-winged sharpshooter numbers. The use of these alternatives will not prevent the build-up and dispersal of the glassy-winged sharpshooter from non-agricultural lands to new areas or nearby crops. While impacts on infested cropland would be slowed, damage to plants caused by *Xylella fastidiosa* in non-agricultural areas would continue, although at a slower rate. The impacts discussed in Appendix B would begin to occur and would continue to increase in severity until either an effective solution to the problem of *Xylella fastidiosa* was found or maximum damage had occurred.

Homeowners, growers, and others would find it necessary to use increasing amounts of pesticides to prevent the impacts brought about by increasing infection rates of *Xylella fastidiosa* in susceptible plants. States and other countries that do not have either glassy-winged sharpshooter or *Xylella fastidiosa* could impose a statewide quarantine on plants and plant products known or suspected of carrying either organism, with likely requirements that some commodities be treated with pesticides and/or inspected prior to shipping, or not be eligible for import.

### **8.5.1 AGRICULTURE AND LAND USE**

Because this alternative would use control methods in non-agricultural areas, some disturbance to residences would occur. The extent of the disturbance would depend on the control method used. If applications of natural pesticides or physical methods were used, homeowners would be inconvenienced by ground crew access similar to the proposed PDCP.

Because growers outside of the generally infested areas would be required under the rapid response program to use pesticides to control the spread of the glassy-winged sharpshooter, the potential disruption to commercial bee colonies, pest management programs, and organic farms could occur, but would not be considered a significant environmental impact. However, because conventional pesticides would not be used in the non-agricultural treatment program, there would possibly be fewer disturbances to honey bee colonies and organic farms than in the proposed PDCP. Disruption to pest management programs could still occur.

Rearing and release of biological control agents would continue under this alternative.

Greenhouses may need to be procured for mass-rearing operations, but like the proposed PDCP, these activities would not result in significant environmental impacts.

The regulations restricting the movement of commodities out of infested areas would be the same as included in the proposed PDCP. Like the proposed PDCP, these restrictions would not result in significant environmental impacts associated with agriculture or land use.

### **8.5.2 HAZARDS**

Under this alternative, pesticide use conducted to qualify shipments for movement out of the infested areas would continue. Growers would be required to use pesticides when new glassy-winged sharpshooter infestations were found. However, the counties would use alternative control methods instead of conventional pesticides in non-agricultural areas. This would result in an initial decrease in pesticide use as a result of the statewide program compared with the proposed PDCP. However, because this alternative would be less effective at controlling the glassy-winged sharpshooter, it is likely that the glassy-winged sharpshooter and impacts from an increased infection rate of *Xylella fastidiosa* in susceptible plants would spread to new areas of the state. As a result, overall use of pesticides by growers could increase to protect individual properties from the effects of *Xylella fastidiosa*. However, no significant human health impacts would be anticipated from pesticide use during application when registered pesticides are used according to label restrictions.

### **8.5.3 WATER QUALITY**

Under this alternative, pesticides would continue to be used by growers to qualify shipments for movement out of an infested area, and growers would continue to treat their crops with pesticides as part of the rapid response program. However, conventional pesticides would not be used to treat non-agricultural areas. Instead, alternative control methods, such as the use of naturally-occurring pesticides, would be used. Initially this would result in a small decrease in the use of conventional pesticides in the statewide program. However, because this alternative would be less effective at controlling the glassy-winged sharpshooter, it is anticipated that the glassy-winged sharpshooter and *Xylella fastidiosa* would spread to new areas of the state. As a result, overall use of pesticides, both conventional and natural, by growers and by individual homeowners would likely increase to protect individual properties from the effects of *Xylella fastidiosa*. Although overall pesticide use

is anticipated to increase throughout the state, measures to mitigate potential water quality impacts are included in pesticide label restrictions, so significant water quality impacts would not occur.

#### **8.5.4 BIOLOGICAL RESOURCES**

Under this alternative, pesticides would continue to be used by growers to qualify shipments for movement out of an infested area, and growers would continue to treat their crops with pesticides as part of the rapid response program. However, alternative control methods, such as the use of natural pesticides, would be used in non-agricultural areas instead of conventional pesticides. Initially this would result in a small decrease in the use of conventional pesticides in the statewide program. However, because this alternative would be less effective at controlling the glassy-winged sharpshooter, it is likely that the glassy-winged sharpshooter and the impacts from an increased infection rate of *Xylella fastidiosa* would spread to new areas of the state. As a result, overall use of pesticides by growers could increase to protect individual properties from the effects of *Xylella fastidiosa*.

If pesticides are used independent of the PDCP, private growers would likely follow pesticide label directions to avoid environmental impacts, but would not be required to consult with USFWS, CDFG, and NMFS, or take additional measures to avoid impacts to threatened and endangered species, sensitive species, and sensitive habitats.

#### **8.5.5 ABILITY TO MEET PROGRAM GOAL**

The overall goal of the proposed PDCP is to minimize the statewide impact of Pierce's disease. Under this alternative, conventional pesticides would not be used in non-agricultural areas. Due to the lack of efficacy of natural pesticide methods, new and existing glassy-winged sharpshooter infestations on non-agricultural lands would continue to increase, leading to increasing spread and impacts due to the glassy-winged sharpshooter and Pierce's disease. Thus, this alternative would not meet the goal of the PDCP.

## **8.6 ALTERNATIVES CONSIDERED BUT WITHDRAWN FROM DETAILED EVALUATION**

### **8.6.1 REGULATE THE MOVEMENT OF COMMODITIES THAT MAY CARRY THE GLASSY-WINGED SHARPSHOOTER AND TREAT NEW GLASSY-WINGED SHARPSHOOTER INFESTATIONS USING ONLY ORGANIC OR BIOLOGICAL CONTROL METHODS**

Under this alternative, CDFA would maintain regulations that restrict the movement of commodities that may carry the glassy-winged sharpshooter (such as nursery stock, citrus and grapes) from infested areas, thereby slowing the artificial movement of the glassy-winged sharpshooter. A detection program would be maintained in those areas free of the pest to support the regulations. Oversight of a comprehensive research program and a public outreach program would continue.

Treatment options for any new infestations outside the generally infested area would be limited to methods other than the use of conventional pesticides, i.e. either natural pesticides, or cultural and/or biological controls.

This alternative is not feasible from a practical or legal standpoint. Most growers who find new infestations on their property will not use less than the most effective, legally available means to protect their crops, as a matter of economic feasibility. There is no legal mechanism to constrain growers from using registered pesticides on their crops. For this reason, this alternative was withdrawn from further analysis in this EIR.

### **8.6.2 ERADICATE THE GLASSY-WINGED SHARPSHOOTER FROM CALIFORNIA**

Under this alternative, all glassy-winged sharpshooter infestations in California would be treated by CDFA and county agricultural commissioners with the most effective methods available until the glassy-winged sharpshooter was eliminated from the state. Unlike the proposed PDCP, treatments would occur regionally in all counties with any glassy-winged sharpshooters.

New and existing glassy-winged sharpshooter infestations would be eradicated through the widespread use of pesticides, reducing the spread of *Xylella fastidiosa*. The impacts from Pierce's disease discussed in Appendix B would not occur. Once the pest is eradicated, homeowners, growers, and others would not have to use pesticides to prevent the impacts due to the glassy-

winged sharpshooter. California's trading partners would not impose a statewide quarantine on plants and plant products known or suspected of carrying the organisms.

There would be a significant multi-year increase in the program use of a number of pesticides. This alternative has been evaluated by the Glassy-winged Sharpshooter Science Advisory Panel, composed of experts on the glassy-winged sharpshooter and Pierce's disease. They have found it to not be feasible, because of the size of the existing infestation, the biology of the pest, and the efficacy of existing control methods (Glassy-winged Sharpshooter Science Advisory Panel, 2000).

## **8.7 ENVIRONMENTALLY SUPERIOR ALTERNATIVE**

Based on the available information, the PDCP is considered the environmentally superior alternative that meets the program goal of minimizing the statewide impact of Pierce's disease.

Although current research efforts show promising results, it is unlikely that a cure for Pierce's disease will be available for growers for several years, if at all. Until a cure is found, the most effective approach for reducing the impacts caused by *Xylella fastidiosa* is to slow the spread of its most important vector, the glassy-winged sharpshooter.

As discussed in the previous sections, feasible alternatives to the PDCP would not meet the goal of the PDCP.

Several of the alternatives evaluated would limit the use of pesticides in the short-term. However, if these alternatives were implemented, it is likely that pesticide use would increase in the state as more growers and homeowners independently treated their properties to control glassy-winged sharpshooter infestations.

Further, as detailed in Chapter 5, the proposed PDCP would not result in significant impacts to the environment.

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## **9.0 IMPORTANT PUBLIC ISSUES NOT WITHIN CEQA'S DEFINITION OF ENVIRONMENTAL EFFECTS**

Issues subject to evaluation under CEQA are limited to those creating the potential for a significant adverse change to the physical environment. To the extent that they are related to the physical environment, issues raised by the public are within the purview of CEQA. Even though a concern is not evaluated in detail in this EIR because it does not fit CEQA's definition of an environmental effect, its importance as a public concern is not diminished. CDFA considers all public concerns in its decision-making. Some public issues about the PDCP that are not environmental effects under CEQA are described below.

Public apprehension exists about any use of pesticides. It is understandable why people feel uneasy and anxious about exposure to or use of pesticides. Even though a material may have been studied extensively, concern is sometimes expressed that there may still exist a potential for causing adverse effects. Some would prefer to not allow the use of any chemical while a continuous search is conducted for other pest control methods. Concerns about uncertainties cannot be resolved. There will always be the prospect of an "unknown." The best that can be offered is reasonable assurance, based on substantial available data, that the hazard potential is less than significant.

Uncertainty over potential for hazard is not resolvable nor is it subject to scientific scrutiny. All pesticides used in glassy-winged sharpshooter control have been subjected to toxicity evaluations and have been approved for use by both the U.S. EPA and the CDPR (which is a division of the California Environmental Protection Agency [CalEPA]). The best data available are used to determine the likelihood of adverse effects arising from registered use. It is misleading to say that long-term effects of an agent are "unknown" when studies have been done utilizing lifetime exposure protocols in which no effects are demonstrated. While additional research may be required to update databases in response to evolving technology or to meet new standards of testing, existing databases are adequate to provide reasonable assurance of low (unmeasurable) hazard.

In addition to apprehension about pesticides, some members of the public are upset over what is characterized as "involuntary exposure." In California, there is a long-standing history of public opposition to government application of pesticides. One of the purposes of this EIR is to inform

the public of the destructive nature of a new and serious pest situation and why it is necessary to take action that may involve some short-term disturbance and inconvenience. A better understanding of the program may lessen the frustration and anxiety felt by the public, while offering insight into the nature of pests and the need to control them.

## 10.0 GLOSSARY

**Ambient** – The surrounding atmosphere or environment.

**Antifeedant** – Any material which induces insects to stop feeding within a short time.

**Beating sheet** – A sheet of fabric stretched onto a frame or crossbars and used to collect insects. The fabric is held under foliage, then the foliage is beaten or shaken and the insects fall onto the fabric.

**Bioaccumulation** – The retention and build-up of a chemical in organisms based on their position in the food chain.

**Biological control** – The use of natural enemies (predators, parasites, parasitoids, pathogens, or competitors) to control pests.

**Buffer zone** – A designated area managed so as to protect and separate two otherwise contiguous areas.

**Carbaryl** – An N-methyl carbamate chemical used as an insecticide. It was introduced as a general use, broad-spectrum insecticide in 1956 and is used worldwide on fruits, vegetables, nuts, landscape plantings, pets, livestock, and human habitat to control insect pests. It is used for household as well as commercial pest management. See

Appendix P for more information about this insecticide.

**Carcinogen** – A substance that causes cancer.

**Carcinogenicity** – The property of being able to cause cancer.

**Containment** – Actions taken to keep pests from spreading.

**Conventional Pesticides** – Pesticides produced through chemical manufacturing processes; also known as synthetic pesticides.

**Cyfluthrin** – A pyrethroid chemical with insecticidal properties.

**Delimitation traps** – Insect traps deployed in a high density to determine the geographic extent of an infestation.

**Egg mass** – A cluster of glassy-winged sharpshooter eggs, usually containing between 10 to 12 eggs.

**Endangered species** – A plant or animal whose survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors (State CEQA Guidelines Section 15380[1]).

**Exotic pests** – Agriculturally or environmentally destructive organisms which are not native to an area.

**Foliar spray** – The application of pesticides onto the leaves of plants.

**Feasible** – Capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors (Section 15364 of the CEQA Guidelines)

**Habitat** – The place where a plant or animal lives. Habitat provides food, water, shelter and living space.

**Half-life** – The time required for half the amount of a substance to be eliminated by excretion, metabolic decomposition, or other natural processes. At the end of a half-life, half of what remains will be eliminated during the next half-life.

**Host plant** – A plant species on which an organism feeds, develops, reproduces, or otherwise may use.

**Imidacloprid** – A type of insecticide. It was first developed in 1985 and gained registration as a new pesticide active ingredient in the United States in 1994. In plants, it is a systemic agent, being absorbed by the plant when applied either to foliage (leaves) or to soil, where it is taken up by the root system. It is also used as a seed treatment. See Appendix P for more information about this insecticide.

**Infestation** – The presence of a reproducing population of an undesirable organism.

**Insecticide** – A material used to kill insects.

**Integrated Pest Management (IPM)** – A pest control strategy that strives to employ the optimum combination of pest management methods, including biological, cultural, mechanical, physical, and/or chemical measures, to maintain a pest population below an economically harmful level.

**Larva** – The immature stage of some insects, between the egg and pupa.

**Life stage** – Any distinctive period in the life of an insect (e.g. egg, nymph, larva, pupa, or adult).

**Mitigate** – To avoid, minimize, rectify, reduce, compensate for, or eliminate the environmental impacts of proposed action(s) (State CEQA Guidelines, Section 15370).

**Mitigation measures** – Activities to minimize, reduce, or eliminate adverse impacts.

**Natural enemy** – Anything that preys upon another organism.

**Non-target organisms** – Any living entity that is not the intended target of a proposed action(s).

**Nursery stock** – Plants produced or offered for sale by commercial growers, wholesalers, or retailers.

**Organic** – Crop production using methods and materials which comply with the requirements of the California Organic Foods Act of 1990 and/or the National Organic Program (not fully implemented until October 2002). In general, it involves the production of crops without the use of conventional (synthetic) pesticides or fertilizers.

**Oviposition** – The deposition of eggs into host material by female insects.

**Parasite** – Any organism that grows, feeds, and is sheltered on or in a different organism while contributing nothing to the survival of the host.

**Parasitoid** – A parasite that completes its larval development within the body of another insect, eventually killing it; a parasitoid is free-living as an adult.

**Pathogen** – Any disease-producing microorganism.

**Pupa** – The immobile resting stage of some insects between the larval and adult stages.

**Pyrethroid** – A kind of insecticide. Pyrethroid compounds are derived from pyrethrins which occur naturally in chrysanthemum flowers. Pyrethroid compounds have been used since the 1940s to control insects in both agriculture and around residences. Some pyrethroids are used to treat humans for lice. Others are used on pets for fleas and ticks. They are used for mosquito and fly control, cockroaches, and general insect management. They are used in poultry houses and on stored grain. See Appendix P for more information about this type of insecticide.

**Riparian habitat** – Habitat characterized by distinctive terrestrial vegetation communities that require free or unbound water; typically located on the banks of rivers, lakes, and streams.

**Significant effect on the environment** – A substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by a project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance (State CEQA Guidelines Section 15382).

**Sweeps (for insects)** – Sampling procedure involving the use of insect nets to catch target insects.

**Threatened species** – A plant or animal species listed by the California Department of Fish and Game or the United States Fish and Wildlife Service as likely to become an endangered species within the foreseeable future in all or a significant portion of its range.

**Treatment** – The application or administration of a chemical material to, or change in the physical state of, a substrate to control a pest organism or disease.

**Treatment area** – That part of an eradication area to which any given treatment is applied.

**Watershed** – The entire area that contributes to a water drainage system or stream.

**Wetlands** – Areas that are inundated by water often enough to support aquatic plants and other aquatic life. Wetlands generally include swamps, marshes, bogs, sloughs, and natural ponds.

**Vector** – An organism that carries disease-causing microorganisms from one host to another.

## **11.0 LIST OF ABBREVIATIONS USED IN THE EIR**

APHIS	Animal and Plant Health Inspection Service (USDA)
CalEPA	California Environmental Protection Agency
CARB	California Air Resources Board
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game
CDHS	California Department of Health Services
CDPR	California Department of Pesticide Regulation
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CUPA	Certified Unified Program Agency
CWC	California Water Code
EHAP	Environmental Hazards Assessment Program
EIR	Environmental Impact Report
ESA	Endangered Species Act
FAC	Food and Agricultural Code
FFDCA	Federal Food, Drug, and Cosmetic Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FQPA	Food Quality Protection Act
GWSS	Glassy-winged Sharpshooter
IPM	Integrated Pest Management
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
NMFS	National Marine Fisheries Service
NOC	Notice of Completion
NOD	Notice of Determination
NOP	Notice of Preparation
PDCP	Pierce's Disease Control Program
PHI	Preharvest Interval
REI	Restricted Entry Interval

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SAP	Science Advisory Panel
SDWA	Safe Drinking Water Act
TMDL	Total Maximum Daily Load
TVWA	Temecula Valley Winegrowers Association
UC	University of California
USDA	United States Department of Agriculture
U.S.EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
Xf	<i>Xylella fastidiosa</i>

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## **13.0 PREPARERS OF THIS REPORT**

### **California Department of Food and Agriculture**

1220 N Street  
Sacramento, CA  
95814

Thomas Esser, Agriculture Program Supervisor

Jim Rains, Staff Environmental Scientist, EIR Project Manager

Valerie Brown, Deputy Secretary

Robert Dowell, Ph.D, Primary State Entomologist

Peter Kurtz, M.D., Ph.D, Senior Medical Coordinator

### **California Department of General Services, Real Estate Services Division**

P.O. Box 989052  
West Sacramento, CA  
95798-9052

Robert Sleppy, Supervising Environmental Planner

Susan K. Stratton, Ph.D., Senior Environmental Planner

### **EDAW, Inc.**

2022 J Street	753 Davis Street
Sacramento, CA	San Francisco, CA
95814	94111
Tel: (916) 414-5800	Tel: (415) 433-1484

Curtis Alling, AICP, Principal-in-Charge

Bobbette Biddulph, Senior Associate, Project Manager

Molly Scarbrough, Environmental Planner, Deputy Project Manager

Leo Edson, Senior Biologist

Nathan Cistone, Word Processor

Stella Kim, Graphic Designer

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX A**

**NOTICE OF PREPARATION**

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**DEPARTMENT OF FOOD AND AGRICULTURE**

1220 N Street, Suite 409  
Sacramento, California 95814  
Telephone: (916) 654-0433  
Facsimile: (916) 654-0403



March 16, 2001

TO: Public Agencies, Private Business Organizations, and Interested Parties

SUBJECT: Notice of Preparation of an Environmental Impact Report for the Proposed  
Pierce's Disease Control Program.

The California Department of Food and Agriculture (CDFA) is preparing an Environmental Impact Report (EIR) for the proposed Pierce's Disease Control Program (PDCP). The goal of the proposed PDCP is to provide a coordinated statewide program that prevents severe agricultural and economic damage by Pierce's disease and its vector, the glassy-winged sharpshooter (an exotic insect in the leafhopper family). The program intends to contain the spread of the glassy-winged sharpshooter and the disease until researchers can find a treatment or cure.

Pierce's disease is caused by a strain of the bacterium *Xylella fastidiosa* that kills grapevines by clogging their water-conducting vessels (xylem). Several strains of this bacterium exist, attacking and causing damage to different host plants including grapes, citrus, stone fruits, almonds, oleander, and certain shade trees (including oaks, elms, maples and sycamore). There is no known cure for the disease. The glassy-winged sharpshooter is an aggressive exotic insect that feeds on the xylem fluid of over 700 plant species and has the ability to spread the bacterium that causes Pierce's disease. The transmission of *Xylella fastidiosa* by the glassy-winged sharpshooter constitutes an unprecedented threat to California's agricultural industry, particularly to California vineyards.

On May 16, 2000, the State Legislature passed emergency provisions (Senate Bill 671, Statutes of 2000, California Food and Agricultural Code, Sections 6045-6047) outlining specific requirements for county agencies, and authorizing the Secretary of Food and Agriculture to adopt program regulations. The proposed program to be evaluated in the EIR is an extension of the ongoing emergency program and regulations. The CDFA is the agency responsible for developing the statewide comprehensive control program. The agricultural commissioner of each county would have the responsibility for local implementation of the program, with oversight by CDFA. The program has five central elements: public outreach, statewide survey and detection, contain the spread, local management areas and rapid response, and research.

A description of the proposed program, potential control approaches, and probable environmental effects are presented in the attached discussion of Project Data and Environmental Effects to be Examined in the EIR.

The CDFA is the Lead Agency for the PDCP and has prepared this Notice of Preparation (NOP) pursuant to Section 15082 of the California Environmental Quality Act (CEQA) Guidelines. The Real Estate Services Division of the California Department of General Services is assisting CDFA in the performance of CEQA review of the PDCP. The purpose of the NOP is to inform agencies and the general public that an EIR is being prepared for this program and to invite specific comments on the scope and content of the EIR. To meet time limits established by state law, your comments must be received no later than April 23, 2001.

Comments should be addressed to:

Ms. Susan Stratton  
Real Estate Services Division  
Department of General Services  
State of California  
1102 Q Street, Suite 5100  
Sacramento, CA 95814  
(916) 323-6951

CDFA is scheduling public scoping meetings to give the public an opportunity to comment on the scope, focus, and content of the EIR. The meetings will be held in four locations in California:

Northern

April 10, 6:00 – 9:00 p.m.  
Napa Valley Expo, Riesling Hall  
575 Third Street  
Napa, CA

Coastal

April 12, 6:30 – 9:00 p.m.  
San Luis Obispo Veterans Hall  
801 Grand Avenue  
San Luis Obispo, CA

Southern

April 18, 6:30 - 8:00 p.m.  
County Administrative Center  
4080 Lemon Street, Room 13  
Riverside, California

Central

April 19, 6:30 – 8:00 p.m.  
Tulare County Agriculture Department  
2500 Burrell Avenue  
Visalia, CA

Scoping meetings will be held during the second and third weeks of April. Any changes to the dates, times, and locations of the scoping meetings will be posted on CDFA's glassy-winged sharpshooter/Pierce's disease information web page at <http://plant.cdfa.ca.gov/gwss>. If you

would like to be put on the mailing list to receive any changes in the public scoping meeting schedule, please contact Susan Stratton at the phone number listed above.

Enclosure

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## I. PROJECT DATA

### 1.1 Project Title

Pierce's Disease Control Program

### 1.2 Lead Agency Name and Address (also project sponsor)

Department of Food and Agriculture  
State of California  
1220 N Street, Room 409  
Sacramento, CA 95814

CEQA Review Contact: Ms. Susan Stratton  
Real Estate Services Division  
State of California  
1102 Q Street, Suite 5100  
Sacramento, CA 95814  
(916) 323-6951

### 1.3 Project Location

The proposed Pierce's Disease Control Program (PDCP) would apply to all counties in California identified as potentially susceptible to Pierce's disease and all areas capable of supporting its vector, the glassy-winged sharpshooter (an insect in the leafhopper family).

County agricultural inspectors throughout the state have performed surveys to identify existing glassy-winged sharpshooter infestations and determine potential local control needs. The surveys revealed that Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties are generally infested with the glassy-winged sharpshooter. Limited infestations of glassy-winged sharpshooter occur in areas of Butte, Contra Costa, Fresno, Kern, Sacramento, Santa Barbara, and Tulare Counties. Other areas of these counties have been surveyed and were found apparently free of glassy-winged sharpshooter populations. If new infestations of the glassy-winged sharpshooter were found in other counties of the State, the PDCP would also apply to the newly infested areas. Nine counties (Alpine, Del Norte, Inyo, Lassen, Modoc, Mono, Plumas, Sierra, and Siskiyou) are deemed not at risk of becoming infested with glassy-winged sharpshooter due to unsuitable environments.

### 1.4 History of Pierce's Disease and the Glassy-winged Sharpshooter

Pierce's disease of grapevines was first noted in California near Anaheim in 1884. Since its discovery, Pierce's disease has spread to other areas of the State and is currently known to exist in 24 counties. There is no known cure for the disease. Pierce's disease is caused by a strain of the bacterium *Xylella fastidiosa* and kills grapevines by clogging up their water-conducting vessels (xylem). Several strains of this bacterium exist, attacking and causing damage to different host plants including grapes, citrus, stone fruits, almonds, oleander, and certain shade trees (including oaks, elms, maples and sycamore). The name of the

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disease caused by *Xylella fastidiosa* varies for each host plant; for example, in oleanders, *Xylella fastidiosa* causes “oleander scorch.”

The glassy-winged sharpshooter is an aggressive exotic insect accidentally introduced into Southern California in the late 1980s. It is native to the Southeastern U.S. and northern Mexico. The glassy-winged sharpshooter is a leafhopper<sup>1</sup> that feeds on the xylem fluid of over 700 species of crop and ornamental plants, and has the ability to spread the bacterium that causes Pierce’s disease. The glassy-winged sharpshooter builds up large populations on a diverse array of host plants and is an aggressive flyer, traveling greater distances than sharpshooters native to California. Scientists believe that the glassy-winged sharpshooter has the potential to increase both the incidence and severity of Pierce’s disease in California. The glassy-winged sharpshooter is prolific, disperses rapidly, and transmits the disease from vine-to-vine, resulting in an exponential, rather than linear, increase in Pierce’s disease incidence in vineyards<sup>2</sup>. A significant loss of grapevines from Pierce’s disease transmitted by this insect has occurred in the Temecula Valley (Riverside County). Over 200 acres of grapes have been destroyed and 300 more acres have been damaged and will likely be dead within the next two years.

The combination of Pierce’s disease, which currently does not have a cure, and the glassy-winged sharpshooter, which has the ability to spread the disease at a much faster rate than other native insects, constitutes an unprecedented threat to California’s agricultural industry. In California, grape production is a \$3.4 billion industry and the wine grape industry alone contributes \$33.7 billion to the California economy. In addition to grapes (886,000 acres), other crops such as almonds (573,000 acres), citrus (297,600 acres), peaches (66,3000 acres), nectarines (35,500), pears (19,300 acres), alfalfa, and ornamentals are vulnerable to the bacterium carried by the glassy-winged sharpshooter<sup>3</sup>.

## 1.5 Legislative and Regulatory Actions Related to the Emergency Program

In response to the Temecula infestation in August 1999, the County of Riverside declared a local emergency. The California Department of Food and Agriculture (CDFA) developed an action plan and appointed a task force to develop long-term strategies and resources to combat the emerging threat. The Pierce’s Disease Advisory Task Force and its subcommittees were established to review research proposals and develop management and control plans. On May 16, 2000, the State Legislature passed emergency provisions (Senate Bill 671, Statutes of 2000) that outline specific requirements for county agencies, and authorize the Secretary of CDFA to adopt program regulations.

The Legislature found and declared that Pierce’s disease and its vectors present a clear and present danger to the State’s grape industry, other agricultural commodities, and plant life. Under State law, the CDFA is responsible for protecting the agricultural industry of the State (Food and Agricultural Code, Section 401). The CDFA is obligated to prevent the introduction and spread of injurious insect and animal pests, plant diseases, and noxious weeds (Section 403). The CDFA Secretary has authority to establish, maintain and enforce quarantine, eradication, and other such regulations that are in his or her opinion necessary to circumscribe and exterminate or prevent the spread of any pest not generally distributed in California (Sections 5321 and 5322).

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1 A leafhopper is any of a number of leaping insects that suck plant juices.

2 CDFA, *Pierce’s Disease Control Program Report to the Legislature, January 2001*.

3 CDFA, *Draft California Action Plan for Pierce’s Disease Control Program*, Sacramento, CA, Feb. 9, 2001

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The Governor requested that the U.S. Department of Agriculture declare a state of emergency under federal law. A federal declaration of emergency was published in the Federal Register on July 7, 2000, with an effective date of June 23, 2000 (65 Federal Register 41930 (July 7, 2000)).

On July 25, 2000, the CDFA, pursuant to legislative mandates, adopted emergency regulations for nursery stock and bulk grapes and coordinated statewide systems for compliance (Sections 3650-3660, Title 3, California Code of Regulations), as provided in the Administrative Procedure Act of the Government Code. On November 8, 2000, the CDFA adopted emergency regulations for bulk citrus movement, certification requirements and exemptions. Both sets of emergency regulations have been readopted one or more times. The regulations implement a Statewide response program for arresting the artificial spread of the glassy-winged sharpshooter and, where feasible, to eradicate it upon its detection in non-infested areas. Because the emergency regulations and response program were created in response to an emergency, the emergency program is exempt from the California Environmental Quality Act (CEQA Guidelines, Section 15269).

## **1.6 Other Public Agencies and Entities whose Review may be Required**

California Department of Conservation  
California Department of Fish and Game  
California Department of Health Services, Environmental Health Investigations Branch  
California Department of Parks and Recreation  
California Department of Pesticide Regulation  
California Department of Transportation  
State Water Resources Control Board  
State Lands Commission  
U.S. Fish and Wildlife Service  
U.S. Department of Agriculture  
University of California  
Agricultural Commissioners of Infested Counties

## **1.7 Program Goals**

The goal of the proposed PDCP is to provide an intensive coordinated statewide program that prevents severe economic damage by Pierce's disease and the vector, the glassy-winged sharpshooter, while remaining responsive to local concerns. Program objectives to achieve this goal are listed below.

- Determine the current distribution of glassy-winged sharpshooter in California and establish a mapping and data collection system to track and report new detections and infestations.
- Develop and disseminate information about the nature, characteristics, and impact of the bacterium that causes Pierce's disease (*Xylella fastidiosa*), and the glassy-winged sharpshooter on various commodities as well as on the economy and quality of life in California.
- Provide training in biology, detection, and treatment of Pierce's disease and its vectors.
- Develop a research program that will aid in the management of and ultimately find a remedy for Pierce's disease and its spread by vectors.

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- Contain the spread of glassy-winged sharpshooter and Pierce's disease until researchers can find a treatment or cure.
  - Prevent artificial spread of glassy-winged sharpshooter through a coordinated program that involves regulating the movement of nursery stock, bulk citrus, bulk grapes, and other commodities that may carry the glassy-winged sharpshooter.

## **1.8 Description of the Proposed Pierce's Disease Control Program**

The proposed program is a comprehensive, statewide extension of the on-going emergency regulations and response program currently being implemented. CDFA is the Lead Agency responsible for developing the statewide comprehensive PDCP. The county agricultural commissioner of each county would have the lead responsibility for local implementation of the program, with oversight by CDFA. The program has five central elements: public outreach, statewide survey and detection, contain the spread, local management/rapid response, and research, which are described in more detail below.

### **1.8.1 Public Outreach**

Local task forces and county agricultural commissioners have primary responsibility for targeted public outreach about glassy-winged sharpshooter, Pierce's disease, and the PDCP. The local task forces would provide information about glassy-winged sharpshooter biology and detection, regulations that affect product shipment or processing, and treatment options. The CDFA would provide technical information, technical support and training, assist in the development and dissemination of literature, and act as a clearinghouse for information to the public and the press.

Prior to any treatment activity in urban areas, a telephone help line would be established to answer calls concerning PDCP activities. The help line would also include public health and animal health information. Informational meetings would be held to advise homeowners and other interested parties of treatment activities and to address their questions or concerns. Pre-treatment notification would be conducted through the local news media and by door-to-door notification of infested properties and adjacent properties. Notices would include information regarding materials used, precautions, date of application, and a telephone number and contact for the PDCP staff.

The responsible county agricultural commissioner would identify ethnic communities in glassy-winged sharpshooter-infested areas and provide information in their spoken languages. Non-English speakers would staff the help line, if needed, and CDFA would provide translations for treatment notification.

### **1.8.2 Statewide Survey and Detection**

Statewide surveys would be conducted annually to identify and monitor glassy-winged sharpshooter infestations and populations through visual and trapping surveys of nurseries, croplands, and urban/residential areas. The CDFA would work with the agricultural commissioners, local entities, and other interested stakeholders of all counties to make them aware of the risk of the glassy-winged sharpshooter and establish a system to assure that all glassy-winged sharpshooter-related calls are investigated. Visual and trapping surveys in nurseries would be conducted year-round as part of the

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PDCP's nursery regulatory program to show a property is free from the glassy-winged sharpshooter. More information about the regulatory program is provided below.

### **1.8.3 Contain the Spread**

The goal of this element of the PDCP is to prevent the glassy-winged sharpshooter and Pierce's disease from spreading into new areas of the State through biological and other control measures and regulating the movement of nursery stock, citrus, grapes, and other commodities, which may harbor the glassy-winged sharpshooter.

#### **Biological Control Program**

The goal of the biological control program is to reduce glassy-winged sharpshooter populations using natural enemies of the pest. In Southern California, the wasp *Gonatocerus ashmeadi* attacks and parasitizes glassy-winged sharpshooter egg masses, but this wasp alone does not reduce glassy-winged sharpshooter populations to acceptable levels. A suite of introduced and native natural enemies would increase the chances for effective biological control over a broader range of host plants and climatic zones.

As part of the emergency program, CDFA released the wasp, *Gonatocerus triguttatus*, in Riverside, Kern and Ventura Counties during summer 2000. This wasp is native to Mexico and, like *Gonatocerus ashmeadi*, also parasitizes glassy-winged sharpshooter eggs. Prior to the release, the wasp underwent an evaluation in a controlled laboratory environment to make sure that the parasite would attack the sharpshooter. Follow up studies will help determine if the new parasite significantly reduces glassy-winged sharpshooter populations. Concurrently with these studies, CDFA would release *G. triguttatus* and other parasites into a large number of locations throughout the entire distribution of the glassy-winged sharpshooter. Greenhouses and other facilities for rearing *G. triguttatus* would be constructed or leased to support this program. CDFA may also contract with private insectaries to supplement their rearing operations.

The biological control program also includes an ongoing search in the southeastern U.S., northern Mexico, and South America to find new predators or parasites that would be effective against the glassy-winged sharpshooter. If discovered, these natural enemies will be evaluated prior to any release.

#### **Regulatory Actions**

PDCP regulations include the standards, certification requirements, and exemptions for the movement of bulk grapes, bulk citrus, and nursery stock from infested areas to non-infested areas. The purpose of the regulations is to prevent the spread of the glassy-winged sharpshooter to new areas of the State by regulating shipments of host plants and plant materials. Surveillance for the glassy-winged sharpshooter would be strengthened at California's agricultural inspection stations and intrastate restrictions on those commodities that present a high risk of spreading glassy-winged sharpshooter would be enforced.

Any grape grower, citrus grower, or nursery located in a glassy-winged sharpshooter infested area planning to ship bulk grapes, citrus or nursery stock to counties outside the known infested area would be required to comply with glassy-winged sharpshooter monitoring and/or treatment requirements. The origin county's agricultural commissioner would enter into compliance agreements with growers and issue certification tags when certain conditions are met. These standards allow for inspection at the origin with certification of glassy-winged sharpshooter-free shipments using visual survey, trapping or approved pesticide

treatment. Color-coded compliance certification tags accompany each load of bulk grapes and citrus and would be collected by the receiver. Regulations also may be to cover other commodities found to present a risk of moving the glassy-winged sharpshooter.

CDFA is in the process of evaluating a number of pesticides for use against the glassy-winged sharpshooter. When additional research is completed, regulatory officials would use the results as a basis for establishing approved regulatory treatments for use against glassy-winged sharpshooter. Materials are also being screened for use on organic crops. Until the tests are completed, any registered insecticide suitable for leafhopper control may be used (See Table 1.7-1). Currently, fenpropathrin and imidacloprid (as a foliar<sup>4</sup> application) are recommended as part of the emergency program for use on nursery stock moving out of the infested area. The criteria for pesticide selection by an individual grower or nursery will depend on their specific circumstances of harvest, worker re-entry, and/or shipment. Pesticides would be used according to EPA registration and label directions.

**Table 1.7-1. Registered Insecticides Suitable for Leafhopper Control**

<b>Grapes</b>	<b>Citrus</b>	<b>Nursery Stock</b>
Carbaryl	Carbaryl	Acephate
Endosulfan	Chlorpyrifos	Bifenthrin
Imidacloprid	Cyfluthrin	Carbaryl
Malathion	Imidacloprid	Chlorpyrifos
Naled	Methidathion	Cyfluthrin
	Methomyl	Deltamethrin
	Phosmet	Fenpropathrin
		Imidacloprid
		Methiocarb
		Permethrin

*Source: Draft California Action Plan for the Pierce's Disease Control Program, CDFCA, February, 2001.*

#### **1.8.4 Rapid Response and Treatment**

When a glassy-winged sharpshooter infestation is discovered, the agricultural commissioner's office would act as the lead agency for all response activities. Immediately following the discovery of one or more life stages of a glassy-winged sharpshooter not associated with a recent shipment of regulated products, the county agricultural commissioner's office would conduct a delimitation survey to determine the extent of the infestation.

The county agricultural commissioner would then coordinate the treatment of infested properties. The county agricultural commissioners, in conjunction with the CDFCA, would consult with the California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service, consistent with existing memoranda of understanding, to identify any threatened/endangered species and/or environmentally sensitive areas within proposed treatment areas before treatments begin. The agencies would then develop appropriate mitigation measures to be taken in these sensitive areas.

Upon detection of the glassy-winged sharpshooter within a nursery or on a crop, the grower/owner of the nursery or crop would be notified that the glassy-winged sharpshooter had been found. The nursery or

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<sup>4</sup> Treatments applied directly to plant leaves.

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crop would then be treated by the grower/owner of the property with a registered pesticide to control the glassy-winged sharpshooter. The State or county would provide guidance and information about registered pesticides shown to be effective against glassy-winged sharpshooter to the individual growers/owners. Growers/owners may apply treatments through foliar spraying, soil drenches, or aerial spraying. Pesticides would be used according to registration and label directions. Nurseries may be required to hold shipments until all host material within the nursery is treated by the nursery with a properly registered pesticide to control the glassy-winged sharpshooter.

Upon detection of a glassy-winged sharpshooter infestation in urban/non-agricultural areas, the county agricultural commissioner would contract with a certified pest control operator to treat the infested areas. The county agricultural commissioner would provide training to personnel and provide oversight to ensure that the contractor conducts the applications in accordance with all laws and regulations of the State of California. The county agricultural commissioners would designate properties that require treatment and the chemical(s) to be used, the rate(s) of application, the host(s) to be treated and any related protocols such as timing of treatments, number of applications, environmental restrictions, etc. Pesticides would be applied directly to the leaves of host plants, to soil, or through injection into trees. The decision to treat an urban area resides with the county agricultural commissioner, in consultation with CDFA. No aerial spraying would occur over urban areas. Over agricultural areas normally subject to aerial application, an owner/grower may choose to treat crops with aerial spraying, in accordance with existing regulations and permits, in coordination with the Pierce's Disease Control Program.

As described in Section 1.8.3 above, CDFA is in the process of evaluating a number of pesticides for use against the glassy-winged sharpshooter. While materials are still being reviewed, carbaryl presently has the widest glassy-winged sharpshooter host range and is known to be effective on other species of leafhoppers. Imidacloprid and cyfluthrin have also been used on ornamental plantings. Until the evaluation is completed, any registered insecticide suitable for leafhopper control may be used in the rapid response and treatment program. All appropriate precautions, as specified on the product label, would be taken by applicators.

As described in Section 1.8.1, notification of treatment would be conducted through public information meetings, the news media, and door-to-door notices. The county agricultural commissioners also would notify registered beekeepers in or near the infested area of the glassy-winged sharpshooter treatment activities, if the label of the pesticide to be used indicates that the treatment may affect bee colonies.

Environmental monitoring of treatments would be arranged by CDFA and conducted by the California Department of Pesticide Regulations (DPR) to ensure proper application of the treatments. The Environmental Hazards Assessment Program (EHAP) of the DPR would conduct monitoring of selected treatments to provide information on the concentrations of the chemical in surface, irrigation, and storm runoff water, turf, soil and air. Additionally, representative backyard vegetables and fruits would be sampled. In the event that ecologically sensitive aquatic habitat is present, toxicity to aquatic organisms would also be determined in surface water. The monitoring data would be used by the CDFA to assess proper application rates and coverage and to estimate environmental impacts of the application. The county agricultural commissioners would also conduct monitoring to assess the impact of the treatment on the glassy-winged sharpshooter population. This monitoring would continue for one or more life cycles of the pest.

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### **1.8.5 Research**

The research component of the PDCP is a joint effort among the CDFA, California Department of Transportation, U.S. Department of Agriculture (USDA), University of California (UC), affected counties, and industry groups. It is a coordinated effort to meet the long-term goal to control Pierce's disease and short-term goal to control the glassy-winged sharpshooter. This effort is coordinated through the Research Subcommittee of the CDFA Secretary's Pierce's Disease Advisory Task Force. The subcommittee has representatives from the various grape-growing industries, citrus, nursery stock and almond growers, USDA and UC. There are currently over fifty scientists working on more than forty projects funded by the State and federal governments and private industry. Research goals include:

- Short-term research goals focus on finding the tools needed to reduce the natural and artificial spread of the sharpshooter, including understanding the biology of the pest and identifying biological control agents.
- Medium-term objectives include discovering how the sharpshooter selects its host plant, analyzing the epidemiology of the disease, and determining if cultural practices can reduce the disease infection rate.
- Long-term research focuses on Pierce's disease, including developing plant resistance to the disease.

## **II. ENVIRONMENTAL EFFECTS TO BE EXAMINED IN THE EIR**

An EIR is a public document that identifies potentially significant environmental impacts of a project and measures to reduce these effects. The environmental factors discussed below have been identified for study in the EIR for the Pierce's Disease Control Program as possible environmental effects, in compliance with the required contents of an NOP. Certain aspects of the PDCP, such as monitoring and outreach activities, would not have environmental effects. Other aspects of the project may have environmental effects. Although the EIR will describe the entire PDCP, the EIR will focus on those aspects of the project with potential environmental effects. An economic or social change by itself is not considered a significant effect on the environment, and thus is not included in the scope of this EIR. Comments on the NOP will help further refine the scope of the EIR.

### **2.1 Land Use Disturbance**

PDCP regulatory actions include restrictions on the movement of goods and vehicles out of an infested area to prevent the spread of the pest. For treatment activities, ground crews would need access to infested properties and land use activities may be suspended during the application. The biological control program of the PDCP would include leasing or construction of additional facilities for rearing natural predators of the glassy-winged sharpshooter.

In order to further evaluate these effects, the EIR will examine the potential for temporary disturbance to land uses when control measures are implemented. Furthermore, the potential for these land use disturbances to result in impacts to the environment will be examined.

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## **2.2 Hazards**

Registered pesticides would be used as part of the PDCP to control the spread of the glassy-winged sharpshooter. The county agricultural commissioners would coordinate treatment upon detection of the glassy-winged sharpshooter in nurseries, cropland, urban areas, and for shipments of bulk grape, citrus, or nursery stock from infested areas. Pesticides would be used according to registration and label directions and all appropriate precautions, as specified on the product label, would be taken by applicators.

The county agricultural commissioners would contract with a licensed pest control operator to treat urban areas infested with the glassy-winged sharpshooter. Pesticides would be applied directly to the leaves of host plants or soil in urban/residential areas by ground crews. Nurseries and crops in infested areas would be treated by the grower/owner of the property. CDFA and the county agricultural commissioners would provide the grower/owner with information about pesticides shown to be effective against glassy-winged sharpshooter. Growers/owners may apply treatments in agricultural areas by foliar spraying, soil drenches, or aerial spraying in agricultural areas.

CDFA and county agricultural commissioners would conduct public outreach activities to advise homeowners and other interested parties of treatment activities. Outreach activities would include a local telephone help line, informational meetings, and door-to-door pre-treatment notification for infested properties and adjacent properties. Notices would include information regarding treatment materials used, precautions, date of application, and a telephone number and contact for PDCP staff.

The EIR will include an analysis of whether health risks or environmental hazards could occur from the proposed PDCP. This analysis will include air quality considerations. Information regarding the pesticides proposed for use will be included to describe whether risks are anticipated with their use. This information will include the regulatory background, pesticide registration process, pesticide data, and proposed program use restrictions.

## **2.3 Water Quality**

Pesticides would be used according to registration and label directions and all appropriate precautions, as specified on the product label, would be taken by applicators. Label requirements include measures such as the avoidance of spraying over water.

To help evaluate the potential for water quality impacts to surface and ground waters, the EIR will include a description of applicable pesticide use restrictions, either through regulation or proposed by the program. The EIR will include an evaluation of potential water quality effects, in consideration of these restrictions and requirements.

## **2.4 Biological Resources**

A Memorandum of Understanding between the CDFA and the CDFG establishes procedures for endangered and threatened species consultation to ensure that fish and wildlife resources are protected in conformance with the California Endangered Species Act (CESA). Prior to pesticide treatment, county agricultural commissioners, in conjunction with the CDFA, would consult with the California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service, consistent with existing memoranda of

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understanding, to identify any threatened/endangered species in the area prior to treatment. The agencies would agree on appropriate mitigation measures to be taken in these sensitive areas.

Label requirements suggest environmentally protective measures, such as the avoidance of spraying blooming plants and avoidance of spraying during windy conditions. DPR, in coordination with CDFA, would conduct monitoring of selected treatments to provide information on the concentrations of the chemical in surface, irrigation, and storm runoff water, turf, soil and air. In the event that ecologically sensitive areas are present, toxicity to aquatic organisms would also be determined in surface water by DPR monitoring.

Past CDFA experience has shown that pesticides may have an impact on non-target insect populations. One of the pesticides identified for use in the PDCP, carbaryl, is known to have impacts upon non-target species, including beneficial insects, such as honeybees and predaceous and parasitic insects (native predators). Because not all insects are equally vulnerable, treatment might result in temporary changes in the composition of local insect populations.

Release of exotic predatory and parasitic insects, such as the wasp *Gonatocerus triguttatus* and others, may also be used to control the glassy-winged sharpshooter. Before these insects are released, they are evaluated in a controlled laboratory environment to determine whether they will attack the glassy-winged sharpshooter. The insects are released after the U.S. Department of Agriculture issues a finding that they will not be a plant pest.

The EIR will include an analysis of potentially affected terrestrial and aquatic biological resources, including threatened and endangered species. The EIR will address whether pesticide treatments or release of biological control agents under the PDCP could affect native plants and animals, including non-target insects.





May 17, 2001

County Clerk  
State of California

Re: Notice of Preparation of an Environmental Impact Report for the Proposed Statewide Pierce's Disease Control Program.

The Department of General Services on behalf of the California Department of Food and Agriculture is sending the enclosed Notice of Preparation (NOP) for posting. Please post the enclosed Notice of Preparation for the Environmental Impact Report for the Proposed Statewide Pierce's Disease Control Program.

We respectfully request that you post this document in a publicly accessible location as a courtesy to the State of California for public review from May 21, 2001 through June 20, 2001.

Thank you for your assistance in making this notice available. Please call me at (916) 323-6951 if you have any questions. Comments may be directed to my attention at the address below.

Sincerely,

Susan K Stratton, Ph.D.  
Senior Environmental Planner  
Department of General Services  
Environmental Services Section  
1102 Q Street, Suite 5100  
Sacramento, CA 95814

Encl.

CC: See Distribution List





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**DEPARTMENT OF FOOD AND AGRICULTURE**

1220 N Street, Suite 409  
Sacramento, California 95814  
Telephone: (916) 654-0433  
Facsimile: (916) 654-0403



May 17, 2001

TO: Public Agencies, Private Business Organizations, and Interested Parties

SUBJECT: Notice of Preparation of an Environmental Impact Report for the Proposed  
Pierce's Disease Control Program.

The California Department of Food and Agriculture (CDFA) is preparing an Environmental Impact Report (EIR) for the proposed Pierce's Disease Control Program (PDCP). The goal of the proposed PDCP is to provide a coordinated statewide program that prevents severe agricultural and economic damage by Pierce's disease and its vector, the glassy-winged sharpshooter (an exotic insect in the leafhopper family). The program intends to contain the spread of the glassy-winged sharpshooter and the disease until researchers can find a treatment or cure.

Pierce's disease is caused by a strain of the bacterium *Xylella fastidiosa* that kills grapevines by clogging their water-conducting vessels (xylem). Several strains of this bacterium exist, attacking and causing damage to different host plants including grapes, citrus, stone fruits, almonds, oleander, and certain shade trees (including oaks, elms, maples and sycamore). There is no known cure for the disease. The glassy-winged sharpshooter is an aggressive exotic insect that feeds on the xylem fluid of over 700 plant species and has the ability to spread the bacterium that causes Pierce's disease. The transmission of *Xylella fastidiosa* by the glassy-winged sharpshooter constitutes an unprecedented threat to California's agricultural industry, particularly to California vineyards.

On May 16, 2000, the State Legislature passed emergency provisions (Senate Bill 671, Statutes of 2000, California Food and Agricultural Code, Sections 6045-6047) outlining specific requirements for county agencies, and authorizing the Secretary of Food and Agriculture to adopt program regulations. The proposed program to be evaluated in the EIR is an extension of the ongoing emergency program and regulations. The CDFA is the agency responsible for developing the statewide comprehensive control program. The agricultural commissioner of each county would have the responsibility for local implementation of the program, with oversight by CDFA. The program has five central elements: public outreach, statewide survey and detection, contain the spread, local management areas and rapid response, and research.

A description of the proposed program, potential control approaches, and probable environmental effects are presented in the attached discussion of Project Data and Environmental Effects to be Examined in the EIR.

The CDFA is the Lead Agency for the PDCP and has prepared this Notice of Preparation (NOP) pursuant to Section 15082 of the California Environmental Quality Act (CEQA) Guidelines. The Real Estate Services Division of the California Department of General Services is assisting CDFA in the performance of CEQA review of the PDCP. The purpose of the NOP is to inform agencies and the general public that an EIR is being prepared for this program and to invite specific comments on the scope and content of the EIR. To meet time limits established by state law, your comments must be received no later than June 20, 2001.

Comments should be addressed to:

Ms. Susan Stratton  
Real Estate Services Division  
Department of General Services  
State of California  
1102 Q Street, Suite 5100  
Sacramento, CA 95814  
(916) 323-6951

---

## I. PROJECT DATA

### 1.1 Project Title

Pierce's Disease Control Program

### 1.2 Lead Agency Name and Address (also project sponsor)

Department of Food and Agriculture  
State of California  
1220 N Street, Room 409  
Sacramento, CA 95814

CEQA Review Contact: Ms. Susan Stratton  
Real Estate Services Division  
State of California  
1102 Q Street, Suite 5100  
Sacramento, CA 95814  
(916) 323-6951

### 1.3 Project Location

The proposed Pierce's Disease Control Program (PDCP) would apply to all counties in California identified as potentially susceptible to Pierce's disease and all areas capable of supporting its vector, the glassy-winged sharpshooter (an insect in the leafhopper family).

County agricultural inspectors throughout the state have performed surveys to identify existing glassy-winged sharpshooter infestations and determine potential local control needs. The surveys revealed that Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties are generally infested with the glassy-winged sharpshooter. Limited infestations of glassy-winged sharpshooter occur in areas of Butte, Contra Costa, Fresno, Kern, Sacramento, Santa Barbara, and Tulare Counties. Other areas of these counties have been surveyed and were found apparently free of glassy-winged sharpshooter populations. If new infestations of the glassy-winged sharpshooter were found in other counties of the State, the PDCP would also apply to the newly infested areas. Nine counties (Alpine, Del Norte, Inyo, Lassen, Modoc, Mono, Plumas, Sierra, and Siskiyou) are deemed not at risk of becoming infested with glassy-winged sharpshooter due to unsuitable environments.

### 1.4 History of Pierce's Disease and the Glassy-winged Sharpshooter

Pierce's disease of grapevines was first noted in California near Anaheim in 1884. Since its discovery, Pierce's disease has spread to other areas of the State and is currently known to exist in 24 counties. There is no known cure for the disease. Pierce's disease is caused by a strain of the bacterium *Xylella fastidiosa* and kills grapevines by clogging up their water-conducting vessels (xylem). Several strains of this bacterium exist, attacking and causing damage to different host plants including grapes, citrus, stone fruits, almonds, oleander, and certain shade trees (including oaks, elms, maples and sycamore). The name of the

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disease caused by *Xylella fastidiosa* varies for each host plant; for example, in oleanders, *Xylella fastidiosa* causes “oleander scorch.”

The glassy-winged sharpshooter is an aggressive exotic insect accidentally introduced into Southern California in the late 1980s. It is native to the Southeastern U.S. and northern Mexico. The glassy-winged sharpshooter is a leafhopper<sup>1</sup> that feeds on the xylem fluid of over 700 species of crop and ornamental plants, and has the ability to spread the bacterium that causes Pierce’s disease. The glassy-winged sharpshooter builds up large populations on a diverse array of host plants and is an aggressive flyer, traveling greater distances than sharpshooters native to California. Scientists believe that the glassy-winged sharpshooter has the potential to increase both the incidence and severity of Pierce’s disease in California. The glassy-winged sharpshooter is prolific, disperses rapidly, and transmits the disease from vine-to-vine, resulting in an exponential, rather than linear, increase in Pierce’s disease incidence in vineyards<sup>2</sup>. A significant loss of grapevines from Pierce’s disease transmitted by this insect has occurred in the Temecula Valley (Riverside County). Over 200 acres of grapes have been destroyed and 300 more acres have been damaged and will likely be dead within the next two years.

The combination of Pierce’s disease, which currently does not have a cure, and the glassy-winged sharpshooter, which has the ability to spread the disease at a much faster rate than other native insects, constitutes an unprecedented threat to California’s agricultural industry. In California, grape production is a \$3.4 billion industry and the wine grape industry alone contributes \$33.7 billion to the California economy. In addition to grapes (886,000 acres), other crops such as almonds (573,000 acres), citrus (297,600 acres), peaches (66,3000 acres), nectarines (35,500), pears (19,300 acres), alfalfa, and ornamentals are vulnerable to the bacterium carried by the glassy-winged sharpshooter<sup>3</sup>.

## 1.5 Legislative and Regulatory Actions Related to the Emergency Program

In response to the Temecula infestation in August 1999, the County of Riverside declared a local emergency. The California Department of Food and Agriculture (CDFA) developed an action plan and appointed a task force to develop long-term strategies and resources to combat the emerging threat. The Pierce’s Disease Advisory Task Force and its subcommittees were established to review research proposals and develop management and control plans. On May 16, 2000, the State Legislature passed emergency provisions (Senate Bill 671, Statutes of 2000) that outline specific requirements for county agencies, and authorize the Secretary of CDFA to adopt program regulations.

The Legislature found and declared that Pierce’s disease and its vectors present a clear and present danger to the State’s grape industry, other agricultural commodities, and plant life. Under State law, the CDFA is responsible for protecting the agricultural industry of the State (Food and Agricultural Code, Section 401). The CDFA is obligated to prevent the introduction and spread of injurious insect and animal pests, plant diseases, and noxious weeds (Section 403). The CDFA Secretary has authority to establish, maintain and enforce quarantine, eradication, and other such regulations that are in his or her opinion necessary to circumscribe and exterminate or prevent the spread of any pest not generally distributed in California (Sections 5321 and 5322).

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<sup>1</sup> A leafhopper is any of a number of leaping insects that suck plant juices.

<sup>2</sup> CDFA, *Pierce’s Disease Control Program Report to the Legislature, January 2001*.

<sup>3</sup> CDFA, *Draft California Action Plan for Pierce’s Disease Control Program*, Sacramento, CA, Feb. 9, 2001

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The Governor requested that the U.S. Department of Agriculture declare a state of emergency under federal law. A federal declaration of emergency was published in the Federal Register on July 7, 2000, with an effective date of June 23, 2000 (65 Federal Register 41930 (July 7, 2000)).

On July 25, 2000, the CDFA, pursuant to legislative mandates, adopted emergency regulations for nursery stock and bulk grapes and coordinated statewide systems for compliance (Sections 3650-3660, Title 3, California Code of Regulations), as provided in the Administrative Procedure Act of the Government Code. On November 8, 2000, the CDFA adopted emergency regulations for bulk citrus movement, certification requirements and exemptions. Both sets of emergency regulations have been readopted one or more times. The regulations implement a Statewide response program for arresting the artificial spread of the glassy-winged sharpshooter and, where feasible, to eradicate it upon its detection in non-infested areas. Because the emergency regulations and response program were created in response to an emergency, the emergency program is exempt from the California Environmental Quality Act (CEQA Guidelines, Section 15269).

## **1.6 Other Public Agencies and Entities whose Review may be Required**

California Department of Conservation  
California Department of Fish and Game  
California Department of Health Services, Environmental Health Investigations Branch  
California Department of Parks and Recreation  
California Department of Pesticide Regulation  
California Department of Transportation  
State Water Resources Control Board  
State Lands Commission  
U.S. Fish and Wildlife Service  
U.S. Department of Agriculture  
University of California  
Agricultural Commissioners of Infested Counties

## **1.7 Program Goals**

The goal of the proposed PDCP is to provide an intensive coordinated statewide program that prevents severe economic damage by Pierce's disease and the vector, the glassy-winged sharpshooter, while remaining responsive to local concerns. Program objectives to achieve this goal are listed below.

- Determine the current distribution of glassy-winged sharpshooter in California and establish a mapping and data collection system to track and report new detections and infestations.
- Develop and disseminate information about the nature, characteristics, and impact of the bacterium that causes Pierce's disease (*Xylella fastidiosa*), and the glassy-winged sharpshooter on various commodities as well as on the economy and quality of life in California.
- Provide training in biology, detection, and treatment of Pierce's disease and its vectors.
- Develop a research program that will aid in the management of and ultimately find a remedy for Pierce's disease and its spread by vectors.

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- Contain the spread of glassy-winged sharpshooter and Pierce's disease until researchers can find a treatment or cure.
  - Prevent artificial spread of glassy-winged sharpshooter through a coordinated program that involves regulating the movement of nursery stock, bulk citrus, bulk grapes, and other commodities that may carry the glassy-winged sharpshooter.

## **1.8 Description of the Proposed Pierce's Disease Control Program**

The proposed program is a comprehensive, statewide extension of the on-going emergency regulations and response program currently being implemented. CDFA is the Lead Agency responsible for developing the statewide comprehensive PDCP. The county agricultural commissioner of each county would have the lead responsibility for local implementation of the program, with oversight by CDFA. The program has five central elements: public outreach, statewide survey and detection, contain the spread, local management/rapid response, and research, which are described in more detail below.

### **1.8.1 Public Outreach**

Local task forces and county agricultural commissioners have primary responsibility for targeted public outreach about glassy-winged sharpshooter, Pierce's disease, and the PDCP. The local task forces would provide information about glassy-winged sharpshooter biology and detection, regulations that affect product shipment or processing, and treatment options. The CDFA would provide technical information, technical support and training, assist in the development and dissemination of literature, and act as a clearinghouse for information to the public and the press.

Prior to any treatment activity in urban areas, a telephone help line would be established to answer calls concerning PDCP activities. The help line would also include public health and animal health information. Informational meetings would be held to advise homeowners and other interested parties of treatment activities and to address their questions or concerns. Pre-treatment notification would be conducted through the local news media and by door-to-door notification of infested properties and adjacent properties. Notices would include information regarding materials used, precautions, date of application, and a telephone number and contact for the PDCP staff.

The responsible county agricultural commissioner would identify ethnic communities in glassy-winged sharpshooter-infested areas and provide information in their spoken languages. Non-English speakers would staff the help line, if needed, and CDFA would provide translations for treatment notification.

### **1.8.2 Statewide Survey and Detection**

Statewide surveys would be conducted annually to identify and monitor glassy-winged sharpshooter infestations and populations through visual and trapping surveys of nurseries, croplands, and urban/residential areas. The CDFA would work with the agricultural commissioners, local entities, and other interested stakeholders of all counties to make them aware of the risk of the glassy-winged sharpshooter and establish a system to assure that all glassy-winged sharpshooter-related calls are investigated. Visual and trapping surveys in nurseries would be conducted year-round as part of the

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PDCP's nursery regulatory program to show a property is free from the glassy-winged sharpshooter. More information about the regulatory program is provided below.

### **1.8.3 Contain the Spread**

The goal of this element of the PDCP is to prevent the glassy-winged sharpshooter and Pierce's disease from spreading into new areas of the State through biological and other control measures and regulating the movement of nursery stock, citrus, grapes, and other commodities, which may harbor the glassy-winged sharpshooter.

#### **Biological Control Program**

The goal of the biological control program is to reduce glassy-winged sharpshooter populations using natural enemies of the pest. In Southern California, the wasp *Gonatocerus ashmeadi* attacks and parasitizes glassy-winged sharpshooter egg masses, but this wasp alone does not reduce glassy-winged sharpshooter populations to acceptable levels. A suite of introduced and native natural enemies would increase the chances for effective biological control over a broader range of host plants and climatic zones.

As part of the emergency program, CDFA released the wasp, *Gonatocerus triguttatus*, in Riverside, Kern and Ventura Counties during summer 2000. This wasp is native to Mexico and, like *Gonatocerus ashmeadi*, also parasitizes glassy-winged sharpshooter eggs. Prior to the release, the wasp underwent an evaluation in a controlled laboratory environment to make sure that the parasite would attack the sharpshooter. Follow up studies will help determine if the new parasite significantly reduces glassy-winged sharpshooter populations. Concurrently with these studies, CDFA would release *G. triguttatus* and other parasites into a large number of locations throughout the entire distribution of the glassy-winged sharpshooter. Greenhouses and other facilities for rearing *G. triguttatus* would be constructed or leased to support this program. CDFA may also contract with private insectaries to supplement their rearing operations.

The biological control program also includes an ongoing search in the southeastern U.S., northern Mexico, and South America to find new predators or parasites that would be effective against the glassy-winged sharpshooter. If discovered, these natural enemies will be evaluated prior to any release.

#### **Regulatory Actions**

PDCP regulations include the standards, certification requirements, and exemptions for the movement of bulk grapes, bulk citrus, and nursery stock from infested areas to non-infested areas. The purpose of the regulations is to prevent the spread of the glassy-winged sharpshooter to new areas of the State by regulating shipments of host plants and plant materials. Surveillance for the glassy-winged sharpshooter would be strengthened at California's agricultural inspection stations and intrastate restrictions on those commodities that present a high risk of spreading glassy-winged sharpshooter would be enforced.

Any grape grower, citrus grower, or nursery located in a glassy-winged sharpshooter infested area planning to ship bulk grapes, citrus or nursery stock to counties outside the known infested area would be required to comply with glassy-winged sharpshooter monitoring and/or treatment requirements. The origin county's agricultural commissioner would enter into compliance agreements with growers and issue certification tags when certain conditions are met. These standards allow for inspection at the origin with certification of glassy-winged sharpshooter-free shipments using visual survey, trapping or approved pesticide

treatment. Color-coded compliance certification tags accompany each load of bulk grapes and citrus and would be collected by the receiver. Regulations also may be to cover other commodities found to present a risk of moving the glassy-winged sharpshooter.

CDFa is in the process of evaluating a number of pesticides for use against the glassy-winged sharpshooter. When additional research is completed, regulatory officials would use the results as a basis for establishing approved regulatory treatments for use against glassy-winged sharpshooter. Materials are also being screened for use on organic crops. Until the tests are completed, any registered insecticide suitable for leafhopper control may be used (See Table 1.7-1). Currently, fenpropathrin and imidacloprid (as a foliar<sup>4</sup> application) are recommended as part of the emergency program for use on nursery stock moving out of the infested area. The criteria for pesticide selection by an individual grower or nursery will depend on their specific circumstances of harvest, worker re-entry, and/or shipment. Pesticides would be used according to EPA registration and label directions.

**Table 1.7-1. Registered Insecticides Suitable for Leafhopper Control**

<b>Grapes</b>	<b>Citrus</b>	<b>Nursery Stock</b>
Carbaryl	Carbaryl	Acephate
Endosulfan	Chlorpyrifos	Bifenthrin
Imidacloprid	Cyfluthrin	Carbaryl
Malathion	Imidacloprid	Chlorpyrifos
Naled	Methidathion	Cyfluthrin
	Methomyl	Deltamethrin
	Phosmet	Fenpropathrin
		Imidacloprid
		Methiocarb
		Permethrin

*Source: Draft California Action Plan for the Pierce's Disease Control Program, CDFa, February, 2001.*

#### **1.8.4 Rapid Response and Treatment**

When a glassy-winged sharpshooter infestation is discovered, the agricultural commissioner's office would act as the lead agency for all response activities. Immediately following the discovery of one or more life stages of a glassy-winged sharpshooter not associated with a recent shipment of regulated products, the county agricultural commissioner's office would conduct a delimitation survey to determine the extent of the infestation.

The county agricultural commissioner would then coordinate the treatment of infested properties. The county agricultural commissioners, in conjunction with the CDFa, would consult with the California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service, consistent with existing memoranda of understanding, to identify any threatened/endangered species and/or environmentally sensitive areas within proposed treatment areas before treatments begin. The agencies would then develop appropriate mitigation measures to be taken in these sensitive areas.

Upon detection of the glassy-winged sharpshooter within a nursery or on a crop, the grower/owner of the nursery or crop would be notified that the glassy-winged sharpshooter had been found. The nursery or

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<sup>4</sup> Treatments applied directly to plant leaves.

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crop would then be treated by the grower/owner of the property with a registered pesticide to control the glassy-winged sharpshooter. The State or county would provide guidance and information about registered pesticides shown to be effective against glassy-winged sharpshooter to the individual growers/owners. Growers/owners may apply treatments through foliar spraying, soil drenches, or aerial spraying. Pesticides would be used according to registration and label directions. Nurseries may be required to hold shipments until all host material within the nursery is treated by the nursery with a properly registered pesticide to control the glassy-winged sharpshooter.

Upon detection of a glassy-winged sharpshooter infestation in urban/non-agricultural areas, the county agricultural commissioner would contract with a certified pest control operator to treat the infested areas. The county agricultural commissioner would provide training to personnel and provide oversight to ensure that the contractor conducts the applications in accordance with all laws and regulations of the State of California. The county agricultural commissioners would designate properties that require treatment and the chemical(s) to be used, the rate(s) of application, the host(s) to be treated and any related protocols such as timing of treatments, number of applications, environmental restrictions, etc. Pesticides would be applied directly to the leaves of host plants, to soil, or through injection into trees. The decision to treat an urban area resides with the county agricultural commissioner, in consultation with CDFA. No aerial spraying would occur over urban areas. Over agricultural areas normally subject to aerial application, an owner/grower may choose to treat crops with aerial spraying, in accordance with existing regulations and permits, in coordination with the Pierce's Disease Control Program.

As described in Section 1.8.3 above, CDFA is in the process of evaluating a number of pesticides for use against the glassy-winged sharpshooter. While materials are still being reviewed, carbaryl presently has the widest glassy-winged sharpshooter host range and is known to be effective on other species of leafhoppers. Imidacloprid and cyfluthrin have also been used on ornamental plantings. Until the evaluation is completed, any registered insecticide suitable for leafhopper control may be used in the rapid response and treatment program. All appropriate precautions, as specified on the product label, would be taken by applicators.

As described in Section 1.8.1, notification of treatment would be conducted through public information meetings, the news media, and door-to-door notices. The county agricultural commissioners also would notify registered beekeepers in or near the infested area of the glassy-winged sharpshooter treatment activities, if the label of the pesticide to be used indicates that the treatment may affect bee colonies.

Environmental monitoring of treatments would be arranged by CDFA and conducted by the California Department of Pesticide Regulations (DPR) to ensure proper application of the treatments. The Environmental Hazards Assessment Program (EHAP) of the DPR would conduct monitoring of selected treatments to provide information on the concentrations of the chemical in surface, irrigation, and storm runoff water, turf, soil and air. Additionally, representative backyard vegetables and fruits would be sampled. In the event that ecologically sensitive aquatic habitat is present, toxicity to aquatic organisms would also be determined in surface water. The monitoring data would be used by the CDFA to assess proper application rates and coverage and to estimate environmental impacts of the application. The county agricultural commissioners would also conduct monitoring to assess the impact of the treatment on the glassy-winged sharpshooter population. This monitoring would continue for one or more life cycles of the pest.

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### **1.8.5 Research**

The research component of the PDCP is a joint effort among the CDFA, California Department of Transportation, U.S. Department of Agriculture (USDA), University of California (UC), affected counties, and industry groups. It is a coordinated effort to meet the long-term goal to control Pierce's disease and short-term goal to control the glassy-winged sharpshooter. This effort is coordinated through the Research Subcommittee of the CDFA Secretary's Pierce's Disease Advisory Task Force. The subcommittee has representatives from the various grape-growing industries, citrus, nursery stock and almond growers, USDA and UC. There are currently over fifty scientists working on more than forty projects funded by the State and federal governments and private industry. Research goals include:

- Short-term research goals focus on finding the tools needed to reduce the natural and artificial spread of the sharpshooter, including understanding the biology of the pest and identifying biological control agents.
- Medium-term objectives include discovering how the sharpshooter selects its host plant, analyzing the epidemiology of the disease, and determining if cultural practices can reduce the disease infection rate.
- Long-term research focuses on Pierce's disease, including developing plant resistance to the disease.

## **II. ENVIRONMENTAL EFFECTS TO BE EXAMINED IN THE EIR**

An EIR is a public document that identifies potentially significant environmental impacts of a project and measures to reduce these effects. The environmental factors discussed below have been identified for study in the EIR for the Pierce's Disease Control Program as possible environmental effects, in compliance with the required contents of an NOP. Certain aspects of the PDCP, such as monitoring and outreach activities, would not have environmental effects. Other aspects of the project may have environmental effects. Although the EIR will describe the entire PDCP, the EIR will focus on those aspects of the project with potential environmental effects. An economic or social change by itself is not considered a significant effect on the environment, and thus is not included in the scope of this EIR. Comments on the NOP will help further refine the scope of the EIR.

### **2.1 Land Use Disturbance**

PDCP regulatory actions include restrictions on the movement of goods and vehicles out of an infested area to prevent the spread of the pest. For treatment activities, ground crews would need access to infested properties and land use activities may be suspended during the application. The biological control program of the PDCP would include leasing or construction of additional facilities for rearing natural predators of the glassy-winged sharpshooter.

In order to further evaluate these effects, the EIR will examine the potential for temporary disturbance to land uses when control measures are implemented. Furthermore, the potential for these land use disturbances to result in impacts to the environment will be examined.

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## 2.2 Hazards

Registered pesticides would be used as part of the PDCP to control the spread of the glassy-winged sharpshooter. The county agricultural commissioners would coordinate treatment upon detection of the glassy-winged sharpshooter in nurseries, cropland, urban areas, and for shipments of bulk grape, citrus, or nursery stock from infested areas. Pesticides would be used according to registration and label directions and all appropriate precautions, as specified on the product label, would be taken by applicators.

The county agricultural commissioners would contract with a licensed pest control operator to treat urban areas infested with the glassy-winged sharpshooter. Pesticides would be applied directly to the leaves of host plants or soil in urban/residential areas by ground crews. Nurseries and crops in infested areas would be treated by the grower/owner of the property. CDFA and the county agricultural commissioners would provide the grower/owner with information about pesticides shown to be effective against glassy-winged sharpshooter. Growers/owners may apply treatments in agricultural areas by foliar spraying, soil drenches, or aerial spraying in agricultural areas.

CDFA and county agricultural commissioners would conduct public outreach activities to advise homeowners and other interested parties of treatment activities. Outreach activities would include a local telephone help line, informational meetings, and door-to-door pre-treatment notification for infested properties and adjacent properties. Notices would include information regarding treatment materials used, precautions, date of application, and a telephone number and contact for PDCP staff.

The EIR will include an analysis of whether health risks or environmental hazards could occur from the proposed PDCP. This analysis will include air quality considerations. Information regarding the pesticides proposed for use will be included to describe whether risks are anticipated with their use. This information will include the regulatory background, pesticide registration process, pesticide data, and proposed program use restrictions.

## 2.3 Water Quality

Pesticides would be used according to registration and label directions and all appropriate precautions, as specified on the product label, would be taken by applicators. Label requirements include measures such as the avoidance of spraying over water.

To help evaluate the potential for water quality impacts to surface and ground waters, the EIR will include a description of applicable pesticide use restrictions, either through regulation or proposed by the program. The EIR will include an evaluation of potential water quality effects, in consideration of these restrictions and requirements.

## 2.4 Biological Resources

A Memorandum of Understanding between the CDFA and the CDFG establishes procedures for endangered and threatened species consultation to ensure that fish and wildlife resources are protected in conformance with the California Endangered Species Act (CESA). Prior to pesticide treatment, county agricultural commissioners, in conjunction with the CDFA, would consult with the California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service, consistent with existing memoranda of

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understanding, to identify any threatened/endangered species in the area prior to treatment. The agencies would agree on appropriate mitigation measures to be taken in these sensitive areas.

Label requirements suggest environmentally protective measures, such as the avoidance of spraying blooming plants and avoidance of spraying during windy conditions. DPR, in coordination with CDFA, would conduct monitoring of selected treatments to provide information on the concentrations of the chemical in surface, irrigation, and storm runoff water, turf, soil and air. In the event that ecologically sensitive areas are present, toxicity to aquatic organisms would also be determined in surface water by DPR monitoring.

Past CDFA experience has shown that pesticides may have an impact on non-target insect populations. One of the pesticides identified for use in the PDCP, carbaryl, is known to have impacts upon non-target species, including beneficial insects, such as honeybees and predaceous and parasitic insects (native predators). Because not all insects are equally vulnerable, treatment might result in temporary changes in the composition of local insect populations.

Release of exotic predatory and parasitic insects, such as the wasp *Gonatocerus triguttatus* and others, may also be used to control the glassy-winged sharpshooter. Before these insects are released, they are evaluated in a controlled laboratory environment to determine whether they will attack the glassy-winged sharpshooter. The insects are released after the U.S. Department of Agriculture issues a finding that they will not be a plant pest.

The EIR will include an analysis of potentially affected terrestrial and aquatic biological resources, including threatened and endangered species. The EIR will address whether pesticide treatments or release of biological control agents under the PDCP could affect native plants and animals, including non-target insects.

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## **PIERCE'S DISEASE CONTROL PROGRAM EIR**

### **APPENDIX B**

#### **AN ANALYSIS OF POTENTIAL IMPACTS OF THE GLASSY-WINGED SHARPSHOOTER IN CALIFORNIA<sup>1</sup>**

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<sup>1</sup> This analysis provides a general discussion and broad overview of the potential impacts in California if the glassy-winged sharpshooter, a new and aggressive vector of Pierce's disease and other related plant diseases, were allowed to spread throughout California. It utilizes uncomplicated assumptions and scenarios to estimate future impacts from this pest, and is intended to provide insight and useful information to decision-makers and laypersons.

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# An Analysis of Potential Impacts of the Glassy-winged Sharpshooter in California<sup>1</sup>

## Summary

The glassy-winged sharpshooter (GWSS) is an exotic (non-native) leafhopper that was first found in California in the early 1990s. This insect is known to transmit plant pathogens, including *Xylella fastidiosa* (*Xf*), the causal agent of Pierce's disease of grapes. Recent outbreaks of GWSS in southern California and parts of Kern County have raised the possibility that there may be an increase in the incidence of Pierce's disease and other *Xf*-caused plant diseases in California with potential devastating impacts on grapes and on other plants that are susceptible to this pathogen as the GWSS spreads throughout the state.

This report evaluates this risk by comparing the disease situation before the arrival of GWSS and after the insect's population explosion. The report will then forecast what future effects GWSS might have on California if the pest continues to spread statewide.

In addition to causing Pierce's disease, the bacterium *Xylella fastidiosa* also causes almond leaf scorch, alfalfa dwarf and oleander leaf scorch. There is evidence that the spread of the GWSS is having the following impacts:

***Movement of *Xf* to areas now free of the pathogen.*** In both Riverside (Temecula) and Kern Counties, Pierce's disease has been seen in areas previously believed to be free of the disease. In Temecula, vineyards throughout the valley now have vines showing Pierce's disease symptoms. In Kern County, the occurrence of Pierce's disease in the General Beale Road area represents a new area of disease incidence. These new areas are not due simply to a greater awareness of the disease and increased vigilance. Searches over the past five years by University of California (UC) Cooperative Extension personnel did not detect any confirmed cases of Pierce's disease from Bakersfield south in Kern County.

***Movement of the pathogen to new plant species causing diseases not seen before in California.*** Oleander leaf scorch was discovered in 1994. The disease is killing oleander plantings, in association with the GWSS. There is potential for the sharpshooter to move *Xf* to other plants causing still more "new" diseases as it spreads into habitats not occupied by native vectors.

***Increase in the rate of transmission to susceptible plantings.*** The rate of death of grapes due to Pierce's disease in Temecula has increased from less than 1% in 1990 to an average of nearly 30% in 2000. This represents a 30-fold increase in less than ten years. This increase is because the sharpshooter is taking the pathogen to vineyards previously beyond the "reach" of native vectors, and because large numbers of the pathogen-carrying sharpshooters

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<sup>1</sup> This analysis provides a general discussion and broad overview of the potential impacts in California if the glassy-winged sharpshooter, a new and aggressive vector of Pierce's disease and other related plant diseases, were allowed to spread throughout California. It utilizes uncomplicated assumptions and scenarios to estimate future impacts from this pest, and is intended to provide insight and useful information to decision-makers and laypersons.

are invading susceptible plantings and moving the pathogen from infected plants to nearby uninfected plants.

***Increase in the rate of Xf spread within plantings of susceptible crops/plants.*** Typical *Xf* spread within California vineyards by native vectors is at a rate that varies from less than 1% to 10% in sites with heavy pressure from native vectors. The rate of *Xf* infection rises and falls unpredictably from year to year. In Temecula, there have been steeper or exponential rates of increase in the incidence of Pierce's disease that spread throughout vineyards within 2 to 3 years. If Temecula represents a typical situation for *Xf* spread by GWSS, the rate at which the pathogen is spread throughout the rest of California will be exponential.

***Creation of patches of diseased plants rather than isolated individuals.*** Native vectors typically inhabit natural weedy habitats and infect plants during feeding forays into vineyards. A combination of movement of *Xf* from outside the vineyard to individual plants and the site of infection by native vectors (see below) limited the physical distribution of infected plants to individual vines scattered within a 300 foot swath bordering the native vegetation in which the native vectors breed. Because GWSS breeds in cultivated crops and ornamental plants, there will be multi-plant disease centers (foci) as the sharpshooter spreads the pathogen from a diseased plant to its neighbors -- something that appears to be negligible with native vectors. Summer infections of grapes with *Xf* by native vectors do not survive winter pruning until the following year, explaining why vine-to-vine movement of chronic Pierce's disease had not been observed before the arrival of GWSS. These multi-plant disease foci, caused by plant-to-plant pathogen transmission, have already been seen in grapes and oleanders in Southern California.

***Movement of the pathogen into urban settings.*** The occurrence of oleander leaf scorch in urban, farm and freeway settings indicates that GWSS may be moving this pathogen into new settings, especially in urban areas.

***Infection of vines below the point at which they are pruned in the winter.*** Glassy-winged sharpshooters have been frequently observed feeding on pruned, dormant grapevines. The infection of the vines early in the season and below the pruning point throughout the year will greatly increase the rate at which GWSS will infect grapevines with *Xf*. Summer infections of woody portions of grape vines by GWSS result in chronic *Xf* infections. In contrast, native vectors of *Xf* feed on and transmit *Xf* to the tips of growing grape stems in the summer. These infections seldom survive the following winter. The result is exponential, vine-to-vine transmission of chronic *Xf* infections by GWSS.

These changes threaten to dramatically alter the dynamics of *Xf*-caused plant diseases in California. Virtually all the grape growing regions of California will experience an increase in Pierce's disease incidence, including areas that have historically had such low infection levels of the disease as to be considered "free" of the disease. If the level rises to a persistent, average annual infection rate of 1%, the *annual* cost to California grape growers could increase to \$230,000,000, as follows:

- Crop losses from dying vines and losses until replacement vines reach full production are estimated to be \$142,000,000.

- The cost of replacing dead/diseased vines will rise to \$25,000,000.
- Treatment costs to protect vineyards are estimated to rise to \$63,000,000.

If the persistent, average infection rate were to rise to a persistent average annual infection rate of 5% in those counties having at least 1,000 acres of citrus (a crop in which the glassy-winged sharpshooter breeds to high numbers), the *annual* impact is estimated to be \$592,000,000 (\$450,000,000 in crop losses, \$78,000,000 in vine replacement costs and \$64,000,000 in pesticide treatment expenses).

Other plantings will be affected by the GWSS. Oleander leaf scorch could cost \$50,000,000 to replace dead and dying oleanders along California highways. The substantial costs of replacing dead oleanders used as ornamental plantings and windbreaks have not been estimated.

The GWSS may transmit the strains of the pathogen already in California to new host plants, as happened with oleander leaf scorch. It may increase the incidence of other *Xf*-caused plant diseases already found in California, including bacterial leaf scorch of oak, maple leaf scorch, alfalfa dwarf and almond leaf scorch. The presence of the sharpshooter also puts several crops at risk should the strains of *Xf* that attack citrus and peach, which are not known to occur in California, reach the state.

# An Analysis of Potential Impacts of the Glassy-winged Sharpshooter in California<sup>1</sup>

By Dr. Robert V. Dowell, Primary State Entomologist

## Introduction

The glassy-winged sharpshooter (GWSS) is an exotic (non-native) leafhopper that was first found in California in the early 1990s (Sorensen and Gill 1996). This insect is known to transmit plant pathogens, including *Xylella fastidiosa* (*Xf*), the causal agent of Pierce's disease of grapes. Recent outbreaks of GWSS in southern California and parts of Kern County have raised the possibility that the spread and establishment of the GWSS may result in an increase in the incidence of Pierce's disease in California with potential devastating impacts on grapes and on other plants that are susceptible to infection by *Xf*.

This report examines this risk by comparing the disease situation before the arrival of GWSS and after the insect's population explosion. The report will then forecast what future effect GWSS might have on California if the pest continues to spread statewide.

## Critical Components

Three types of organisms have shaped the current situation: the bacterial disease agent, the insect vectors of the disease agent and the susceptible host plants of the disease agent. All three must be present with the proper environmental conditions that allow their survival and growth before any problems can occur.

**The disease agent** is *Xf*, a bacterium that is pathogenic (disease-causing) and occurs in the xylem or water-carrying tubes of susceptible plants. Xylem-feeding insects such as certain leafhoppers or spittlebugs transmit *Xf* from plant to plant. In the plant, *Xf* may be limited to the immediate tissue where it was introduced, as a localized infection, or it may move throughout the xylem system as a systemic infection. *Xf* may be found in one of two states within the plant, depending on the plant species: 1) the bacterium may be present but cause no visible disease symptoms in the plant (e.g. blackberry); or 2) it may damage or kill the plant (e.g. *Vitis vinifera* grapes or almonds). *Xf* is the causal agent of a number of diseases of food and ornamental plants (Table 1).

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<sup>1</sup> This analysis provides a general discussion and broad overview of the potential impacts in California if the glassy-winged sharpshooter, a new and aggressive vector of Pierce's disease and other related plant diseases, were allowed to spread throughout California. It utilizes uncomplicated assumptions and scenarios to estimate future impacts from this pest, and is intended to provide insight and useful information to decision-makers and laypersons.

**Table 1. Plant Diseases Caused by *X. fastidiosa***

Disease	Host	Kill Host	Severity of Damage	Present in California
Pierce's disease	grape	yes	high	yes
Almond leaf scorch	almond	yes	high	yes
Oleander leaf scorch	oleander	yes	high	yes
Phony peach disease	peach	no	high	no
Alfalfa dwarf disease	alfalfa	no	slight to moderate	yes
Citrus variegated chlorosis	citrus	no	high	no
Bacterial leaf scorch of elm	elm	no	moderate to high	no
Bacterial leaf scorch of sycamore	sycamore	no	moderate to high	no
Pear scorch	pear	no	moderate	no
Bacterial leaf scorch of oak	oak	no	moderate to high	?*
Maple leaf scorch	maple	no	moderate to high	?*
Mulberry leaf scorch	mulberry	no	moderate	no
Pecan leaf scorch	pecan	no	moderate	no

\* Rarely found in California. When found, affected trees exhibit milder symptoms than those observed in the eastern U.S., suggesting a more virulent strain is present in the east.

**The vectors** of *Xf* are insects that feed on the xylem fluid of plants. This includes spittlebugs, cicadas, and some leafhoppers. These insects use piercing/sucking mouthparts to pierce plant tissue and suck out the xylem fluid. The bacterium is picked up by the mouthparts during feeding. The bacterium remains on the mouthparts and can be mechanically transmitted to another plant when the insect next feeds. The bacterium reproduces within the insect body and can be immediately transmitted after being acquired, but it is lost whenever the insect molts (sheds its skin). However, adult insects do not molt and, once having acquired the bacterium, remain infective throughout their life. Several native insects can acquire and transmit *Xf* (Table 2 ) (Freitag et al. 1952) in addition to the exotic GWSS.

**Susceptible plants** are plants that can support growth and survival of *Xf*. Most susceptible plants do not manifest disease symptoms. *Xf* has been recovered from over 225 plant species (web site [CNR.Berkeley.EDU/xylella/temp/hosts.htm](http://CNR.Berkeley.EDU/xylella/temp/hosts.htm)). Common plants from which *Xf* has been recovered include blackberry, Oregon ash, California bay laurel, box elder, elderberry, wild grape, Bermuda grass, and umbrella sedge (Purcell, <http://www.CNR.Berkeley.EDU/xylella> ).

**Table 2. Partial List of *X. fastidiosa* Vectors\* in California**

<u>Scientific Name</u>	<u>Common Name</u>
<b><i>Sharpshooters</i></b>	
<i>Cuerna occidentalis</i>	occidental sharpshooter
<i>Cuerna yuccae</i>	
<i>Draeculacephala californica</i>	California sharpshooter
<i>Draeculacephala crassicornis</i>	
<i>Draeculacephala minerva</i>	grass or green sharpshooter
<i>Draeculacephala noveboracensis</i>	
<i>Friscanus friscanus</i>	lupine sharpshooter
<i>Graphocephala atropunctata</i>	blue-green sharpshooter
<i>Graphocephala confluens</i>	willow sharpshooter
<i>Graphocephala hieroglyphica</i>	
<i>Homalodisca coagulata</i>	glassy-winged sharpshooter
<i>Homalodisca lacerta</i>	smoketree sharpshooter
<i>Pagaronia confusa</i>	
<i>Pagaronia furcata</i>	
<i>Pagaronia tredecimpunctata</i>	
<i>Pagaronia triunata</i>	
<i>Xyphon (Carneocephala) fulgida</i>	red-headed sharpshooter
<b><i>Spittlebugs</i></b>	
<i>Aphrophora angulata</i>	
<i>Aphrophora permutata</i>	
<i>Clastoptera brunnea</i>	
<i>Philaenus spumaria</i>	meadow spittlebug

\*Names per Nomina Insecta Nearctica

Note: Common names have been provided where they are available.

### **Brief History of *Xylella fastidiosa* in California**

Hewitt (1958) concluded that *Xf* was introduced into California prior to 1880 in cuttings and wild grapes brought in from the southeastern United States. These and other grape species were being tested as rootstock for *Vitis vinifera* (the European grape grown for wine, table grapes, and raisins in California) as well as for their resistance to grape phylloxera, a pest of grapevines that can kill the plant. Others (Purcell pers. comm.) note that *Xf* may have been present in California before the arrival of *Vitis vinifera* grape vines. In either case, major epidemics of what is now called Pierce's disease were first noticed in the Los Angeles basin in the 1880s. By 1886, the loss of vines to Pierce's disease had become "seriously threatening." By 1890, some 25,000 acres of vines had been killed in southern California (Smith 1946).

Subsequent outbreaks in southern California essentially eliminated grape growing in that area, despite the excellent climate and soil. Pierce's disease caused extensive vine death in the Central Valley in the 1920s and it continues to be a significant cause of vine death in the Napa region.

It is likely that *Xf* can be found everywhere in California that grapes, almonds and oleanders are grown. A possible exception is the Sierra foothills above Placerville. The importance of *Xf* in a given area is the result of the interaction among the vectors, susceptible hosts, the pathogen, and climatic factors, including winter cold temperatures.

## **Potential GWSS Disruption of *X. fastidiosa* Dynamic in California**

In order to understand how GWSS might upset the *Xf*-caused disease epidemiology in California, we must first detail what the *Xf*-caused disease situation was before the arrival of this exotic vector, describe where GWSS might survive and breed in the state, and detail how GWSS differs from the native *Xf* vectors. The following are brief accounts of the *Xf*-caused disease situation in five regions of California: Temecula Valley, San Joaquin Valley, Sacramento Valley, Napa region, and the urban environment.

### **Status of *Xf*-caused diseases in California before 1990**

**Temecula/Southern California.** Pierce's disease was present but virtually unknown in Temecula. Most of the growers did not know what a Pierce's-diseased plant looked like, so vine losses due to Pierce's disease were probably attributed to other causes. Vine deaths were widely scattered and affected individual vines. There was a small outbreak in Temecula in 1997 in a vineyard next to a catch basin where willow and other riparian plants harbored large numbers of willow sharpshooters. This vineyard was removed and so was the disease (to the best of the grower's knowledge). It is estimated that the loss rate of vines from Pierce's disease at this time throughout the valley was 0.001% per year (Drake pers. comm.). The GWSS was not found in sticky traps in this vineyard in 1997, but GWSS had been noticed elsewhere in the Temecula Valley in 1996.

Oleander leaf scorch was unknown in southern California until the mid-1990s (Purcell et al. 1998). Almond leaf scorch was first detected in the Mohave desert in southern California in the 1950s and in northern California in the 1960s, but it may have been present for an unknown number of years before that (Purcell web site: [CNR.Berkeley.EDU/xylella](http://CNR.Berkeley.EDU/xylella)).

**San Joaquin Valley.** Pierce's disease was present in the Valley but outbreaks were localized and confined to "hotspots" where sufficient numbers of vectors were present to transmit the disease. Most growers knew where these hotspots were and Pierce's disease did not occur in the vineyards of the vast majority of these growers. Widely scattered deaths of individual vines due to *Xf* were attributed to other causes. The overall rate of loss of vines to Pierce's disease was estimated to be 0.001% per year (Luvisi pers. comm.)

Almond leaf scorch was present in the Valley but affected few trees per year overall (Purcell, web site: [CNR.Berkeley.EDU/xylella](http://CNR.Berkeley.EDU/xylella)). Hot spots occurred in Contra Costa and San Joaquin Counties. Oleander leaf scorch was unknown in the San Joaquin Valley (Purcell et al. 1998).

**Sacramento Valley.** Pierce's disease incidence mirrored that in the San Joaquin Valley. The annual loss rate due to Pierce's disease was estimated to be 0.001% per year. Efforts to locate Pierce's disease in Merced, San Joaquin and Stanislaus Counties in the 1970s did not find any. Currently, there have been no confirmed reports of Pierce's disease in these counties for at least 30 years (Purcell pers. comm.).

Almond leaf scorch was present and localized problem areas existed. In Contra Costa County, there was no relationship between the presence of Pierce's disease and almond leaf scorch (Purcell 1980). This suggests that the key vectors of Pierce's disease are different from those for almond leaf scorch. Oleander leaf scorch has not been officially confirmed in northern California (Purcell et al. 1998).

**Napa Region.** Pierce's disease was present and localized hotspots typically extended about 300 feet from riparian settings where the native sharpshooter vectors harboring the pathogen bred and multiplied. The extensive growth of vineyard acreage has resulted in more plantings close to riparian areas, accompanied by an increase in Pierce's disease in these vineyards. However, many areas had little to no Pierce's disease. Overall infection rates varied from near zero for most vineyards to over 10% per year, depending on the vineyard location. The average loss rate from Pierce's disease was probably less than 2% per year (Purcell pers. comm.). Surveys during the 1990s, based on grower responses to questionnaires and economic analysis, projected losses in Napa and Sonoma Counties at 25 to 30 million dollars per year (North Coast Pierce's Disease Task Force Report 2000).

Almond leaf scorch and oleander leaf scorch were not known from the area (Purcell, web site: CNR.Berkeley.EDU/xylella, Purcell et al. 1998).

**Urban setting.** *Xf*-caused diseases were generally not known from urban settings in California. This is likely due to a lack of knowledge about the true cause of the death of grapevines and almond trees rather than a lack of the pathogen. It is very likely that some grapevines and almond trees were killed by the pathogen but that their loss was attributed to other causes. The loss rate was likely very low--on the order of 0.001% per year or less.

Oleander leaf scorch was unknown in the urban areas of California (Purcell et al. 1998).

**Overall,** Pierce's disease was present in all the grape-growing areas, except perhaps the Sierra foothills. The occurrence of Pierce's disease in most of northern California has been rare since the 1940s. Growers knew of isolated hotspots of the disease but the vast majority of the area was thought to be free of the disease. The loss of widely scattered individual vines was attributed to other causes. Hotspots existed in areas near breeding sites of native vectors, generally riparian or grassland settings (Purcell pers. comm.). With the possible exception of parts of the Napa region, the incidence of Pierce's disease was low enough that the loss rate of vines was within manageable and acceptable limits of 0.001% per year or 1 in 100,000 vines.

Almond leaf scorch also occurred in isolated hotspots in Contra Costa County with the majority of the acreage having virtually no disease. The hotspots were in proximity of a source of vectors, but the key factors for almond leaf scorch appear to be different from those for Pierce's disease.

Oleander leaf scorch was unknown in California.

## Potential Distribution of GWSS in California

The GWSS is found throughout the southeastern United States from Texas to Florida and north to the Carolinas and west to Tennessee. The insect is very rare at the outer edge of its distribution. This analysis compared the winter cold temperatures with the outer edge of the GWSS distribution in the southeast (Turner and Pollard 1959) and found an excellent correlation between the outer edge of its distribution and the average low daily temperatures in January and February (web site: [water.dnr.state.sc.us/climate.sercc/se01min](http://water.dnr.state.sc.us/climate.sercc/se01min)). GWSS is confined to the area where the average daily low temperature is above about 28° F in January and February. This same area has daily average high temperatures in January of less than 50° F (Figures 1-4) (web site: <http://www.water.dnr.state.sc.us/climate.sercc/se01min>). This suggests (but does not prove) that GWSS distribution is cold-limited.

We can use these data to predict where GWSS might find its outer limits in California (Figure 5). In general, GWSS is expected to survive throughout the Sacramento and San Joaquin Valleys from Redding south to Bakersfield. It will survive in the foothills below about 2000 feet, with this line rising to the south and dropping to the north. GWSS is expected to survive along the coast to the Oregon border and to follow the lower foothills inland around to Clear Lake. All the major grape and almond growing regions in California, except the Sierra foothills, fall within the area in which the conditions are conducive to GWSS survival.

The discovery of isolated GWSS infestations in Sacramento, Contra Costa, Santa Clara and Butte Counties indicates that the pest is able to survive and breed at least as far north as Chico and in the greater San Francisco Bay Area.

GWSS numbers are expected to be lowest at the outer edge of this area and to be greater in the warmer areas where the susceptible crops are grown. It is not known what effect(s) the cool summer temperatures found along the north coast will have on GWSS population dynamics.

## Comparison of GWSS Biology with Native Vectors

GWSS differs from native vectors in several important biological traits (Table 3) (Purcell, Testimony before Assembly Agricultural Committee, October 12, 1999). GWSS breeds in crops like citrus and grapes. Whether it can reproduce in riparian habitats in California is unclear, but GWSS does inhabit these areas in the southeastern U.S. With likely reproduction in both undisturbed areas and croplands, GWSS can colonize areas far removed from those used by native vectors.

**Table 3. Comparison of biological traits of GWSS and native *X. fastidiosa* vectors**

<u>Trait</u>	<u>GWSS</u>	<u>Native Vectors</u>
Breeds extensively in crops like citrus or grapes	Yes	No
Confined to areas near grassland/riparian settings	No	Yes
Typical movement more than 300 feet from breeding sites	Yes	No
Reaches great numbers in crop systems	Yes	No
Effective <i>Xf</i> vectors	Yes	Yes
Common in urban settings	Yes	only BGSS*
Feed on larger, older plant tissue	Yes	No
Feed on dormant grape vines	Yes	No
Changes host plants frequently	Yes	No

\* blue-green sharpshooter

GWSS also moves greater distances than the native vectors in its search for feeding and breeding sites. Because GWSS breeds in crops rather than just feeding in them, it reaches greater densities in the crops than are typically seen with native vectors. GWSS is very common in the urban areas of southern California and the Bakersfield area of Kern County.

GWSS is larger than native vectors and feeds on older, larger plant tissue than its native counterparts. GWSS can infect grapevines at points below where the vines are pruned each year, unlike native vectors that tend to feed and infect smaller, newer growth that is often removed during pruning. Unlike native vectors, GWSS freely feeds on and infects grapevines in the winter. These early season infections are more important than later infections because they have a greater probability of the pathogen moving below the point where the plant is pruned during the dormant season. Winter-feeding by GWSS on pruned vines will, by definition, infect them below the point where they are pruned. It is not yet known if fall or winter inoculations of grape vines with *Xf* can establish chronic infections as *Xf* infections composed of a small number of bacteria may not survive cool temperatures.

### Potential Changes in *Xf* dynamics in California Due to GWSS

Below are the potential changes that GWSS could cause in the epidemiology of *Xf* in California:

**1) Disseminate *Xf* to areas now free of the pathogen.**

*This will arise from the ability of GWSS to breed in habitats other than grasslands or riparian settings used by native vectors.*

**2) Disseminate the pathogen to new plant species, perhaps causing diseases not seen before in California.**

*This appears to have occurred in oleander and may do so in other plants because GWSS feeds and breeds on a large variety of plants. Other “exotic”*

*strains of Xf may be present in California but have not been noticed because of their rarity.*

**3) Increase the rate of Xf transmission to susceptible plantings.**

*This will arise from the large populations that GWSS achieves in both urban and agricultural settings.*

**4) Increase the rate of Xf infection within plantings of susceptible crops/plants.**

*This will arise because GWSS feeds and breeds in numerous plants including grapes and oleanders in such a way that the plant-to-plant spread of Xf establishes chronic infections.*

**5) Result in expanding patches of diseased plants rather than isolated diseased individual plants.**

*This will arise from the extensive feeding and breeding of large numbers of GWSS within crop/ornamental plantings.*

**6) Disseminate the pathogen into urban settings.**

*This will arise because GWSS breeds on plants in urban settings.*

**7) Infect vines below the point at which they are pruned in the winter.**

*Because GWSS feeds on larger, older parts of vines than native sharpshooters, it may infect the plants earlier in the season and below the point at which they are pruned each year.*

## **Have These Changes Been Seen in California?**

The obvious question is whether the predicted GWSS-mediated changes in Xf epidemiology have been observed in California. The answer is yes.

***Dissemination of Xf to areas now free of the pathogen.*** In both Riverside (Temecula) and Kern Counties, Pierce's disease now occurs in areas previously believed to be free of the disease. In Temecula, vineyards throughout the valley now have vines showing Pierce's disease symptoms. In Kern County, the occurrence of Pierce's disease in the General Beale Road area represents a new area for the disease. These new areas are not due simply to a greater awareness of the disease and increased vigilance, because the disease rates are far greater than expected in both areas, they are greater than those that had been noticed prior to the current control program and in southern Kern County surveys by the University of California did not detect the disease in grapes in that area.

***Dissemination of the pathogen to new plant species causing diseases not seen before in California.*** Oleander leaf scorch was discovered in 1994. The disease is killing mature oleander plantings (greater than 30 years old) and is found in association with the GWSS. There is potential for the sharpshooter to take Xf to other plants causing still more "new" diseases as it spreads into areas not occupied by native vectors.

***Increase in the rate of Xf transmission to susceptible plantings.*** The rate of death of grapes due to Pierce's disease in Temecula has increased from an average of less than 1% in 1990 to an average 30+% in 2000. This represents a 30-fold increase in less than ten

years. This exponential increase is because the GWSS is transmitting the pathogen to vineyards previously beyond the “reach” of native vectors, because large numbers of the pathogen-carrying GWSS are invading susceptible plantings and because GWSS is transmitting *Xf* within vineyards by moving the pathogen from vine to vine.

***Increase in the rate of pathogen spread within plantings of susceptible crops/plants.***

Typical Pierce’s disease spread within California vineyards results in a rate of infection that varies from less than 1% in areas with few vectors to 10% in areas with high densities of native vectors. The rate rises and falls unpredictably from year to year. In Temecula, there has been a much steeper, or exponential rate of increase in the incidence of diseased plants to over 90% infection in some vineyards (Purcell pers. comm.). If Temecula represents a typical situation for *Xf* spread by GWSS, the rate at which the pathogen is spread will be exponential.

***Creation of patches of diseased plants rather than isolated individuals.*** Native vectors inhabit natural riparian or weedy habitats and infect few plants on forays into vineyards. Because GWSS breeds in cultivated crops and ornamental plants, there will be multi-plant disease centers (foci) as the sharpshooter spreads the pathogen from a diseased plant to its neighbors -- something that appears to be negligible with native vectors. Summer infections of grapes by native vectors do not survive dormant pruning, explaining why vine-to-vine movement of chronic Pierce’s disease has not been observed before the arrival of the GWSS (Purcell pers.comm.). These multi-plant disease foci, caused by plant-to-plant pathogen transmission, already have been seen in grapes and oleanders in Southern California.

***Movement of the pathogen into urban settings.*** The discovery of oleander leaf scorch in urban, farm and freeway settings in southern California indicates that GWSS may be transmitting this pathogen into new settings, especially urban areas.

***Infection of vines below the point at which they are pruned in the winter.*** Glassy-winged sharpshooters have been frequently observed feeding on pruned, dormant grapevines. The infection of the vines early in the season and below the pruning point throughout the year will greatly increase the rate at which grapevines will become infected with Pierce’s disease. Summer infections of woody portions of grape vines by GWSS result in chronic *Xf* infections. In contrast, native vectors of *Xf* inoculate the tips of growing grape stems in the summer. These infections seldom survive the following winter. The final result is exponential, vine-to-vine transmission of chronic *Xf* infections by GWSS (Purcell pers. comm.).

### **What is the Status of *Xf* in Kern County and Rural Southern California?**

A tour of the Temecula area was conducted in December 2000. The grape growing area is a small valley surrounded by scrub vegetation. There is a small riparian area with no vineyards nearby. The grape vineyards are interspersed with citrus orchards and some homes. The only area for native vectors to breed in Temecula is in the riparian area. GWSS is breeding in the citrus, grapes, and ornamental vegetation around the homes and wineries. GWSS numbers were as high as 60 per trap per week prior to the start of area-wide pesticide treatments applied to all citrus and grape crops in the valley.

Symptoms of Pierce's disease were found in every vineyard in the area. The symptoms ranged from stunted new growth to the elimination of entire vineyards when the infestation rate reached 30-40%. Infection rates of over 90% were seen in some vineyards (Purcell pers. comm.). At least five vineyards had been pulled. The infection rate was not uniform and depended on the grape variety, rootstock, distance from citrus orchards, and other unknown factors. In many vineyards there were "holes" or gaps where groups of diseased vines had been pulled. This gave the vineyards in the valley a "moth eaten" appearance.

The area-wide pesticide spray program, using chlorpyrifos foliar sprays and imidacloprid soil applications, lowered GWSS numbers from 60 per trap per week to 0.2 GWSS per trap per week. It was difficult to find GWSS in the valley in December 2000. It is unknown what effect this extensive control program will have on GWSS numbers during 2001.

Pierce's disease symptoms were found on every grape variety and on every rootstock type. Infected vines take from 1 to 2 years to show symptoms depending on vine age, variety and rootstock. An early symptom is a reduction in fruit set and a desiccation of fruit that is set as the bacteria clog the xylem (water carrying) tissue leading to the grape bunches. Because of the lag between infection and symptoms, the incidence of Pierce's disease in the valley will likely continue to rise this year and whether or not the pathogen continues to be spread.

Some growers in the valley are pulling diseased vines in an effort to limit the intra-vineyard spread of the disease. Virtually every vineyard has had some vines pulled due to Pierce's disease. Entire vineyards are pulled when the infection rate hits 30 to 40%, following extensive crop loss.

In Kern County, the situation is not as advanced as in Temecula. Pierce's disease had been present in isolated hot spots where sufficient numbers of native vectors were present due to the proximity of a riparian area or the presence of grass in the vineyard throughout the year. Grape vineyards are interspersed with citrus, almonds, alfalfa and other crops. Now, GWSS numbers are high in the citrus and the pest freely moves from the citrus into the vineyards.

Pierce's disease occurs in the General Beale Road area, an area not previously known to have the disease. The disease is currently found in small groups of vines in several vineyards and growers are pulling the diseased vines. One can imagine that the Kern County Pierce's disease situation mirrors that in Temecula a few years ago.

An area-wide GWSS control pilot program has been started in Kern County in an attempt to lower GWSS numbers and the spread of Pierce's disease. Given the time lag between infection and the manifestation of disease symptoms, the number of vines showing Pierce's disease will be expected to increase in Kern County for the next two years regardless of the effects of the area-wide GWSS pilot control program.

GWSS has helped to spread the *Xf* strain that causes oleander leaf scorch throughout the urban and agricultural areas of southern California. Plantings of the shrub used as landscape and windbreaks have been killed. Most alarming is that oleanders planted in the medians of highways may provide an effective dispersal avenue for both the vector and the pathogen. Symptoms that look like oleander leaf scorch occur in oleanders along highway medians in Kern, Tulare and Fresno Counties, but the presence of the pathogen has not been confirmed.

## Predicting What GWSS Might Do to the Dynamics of *Xf* in California

We can use the experiences in Temecula, Kern County, and the rural areas of southern California and the biology of the GWSS to develop a set of predictions about what the insect might do to the dynamics of *Xf* and the epidemiology of the plant diseases it causes in California. These predictions are based on a series of assumptions, both general and plant-specific, that are discussed below.

### General Assumptions

- a) If left unabated, GWSS will continue to spread throughout California until it reaches its climatic limits as approximated in Table 5.
- b) GWSS population densities in commercial citrus will attain the levels seen in Kern County and Temecula.
- c) GWSS population densities in the urban areas will attain the levels seen in southern California and Kern County.
- d) Unfettered, GWSS will spread throughout all of Kern County in five years and throughout its potential range in California in ten years.

### Oleander Leaf Scorch

- e) Oleander leaf scorch will kill ornamental plantings and highway median plantings of oleander at the same rate as seen in southern California.
- f) Oleanders will be pulled and replaced when the death rate of diseased plants exceeds 5%.
- g) Pesticide sprays will not be used to protect the oleanders in highway median plantings. Instead, the oleanders will be replaced with another plant species unaffected by *Xf*.

### Almond Leaf Scorch

- h) The impact of GWSS on almond leaf scorch will range from no impact to an average infection rate of 5% per year in commercial almonds.
- i) The rate of increase of almond leaf scorch will double each year from current levels until it reaches its average rate in six years (Table 7).
- j) Almond leaf scorch will be more severe in counties with commercial citrus acreage greater than 1,000 acres (Table 4). Orchards at high risk of almond leaf scorch because of their proximity to breeding sources of GWSS (e.g. citrus orchards) will reach unacceptable levels of the disease in 3 to 5 years.
- k) Growers will pull and replace infected trees after the death rate in the orchard equals or exceeds 1%.
- l) Pesticide sprays will be applied to protect almonds and these sprays, combined with pruning and the removal of dead or dying trees, will prevent the infection rate from exceeding an average of 5% per year.

## Pierce's Disease

- m) In areas with at least 1,000 acres of commercial citrus, Pierce's disease rates will attain the levels seen in Temecula with an average infection rate of 5% per year (Table 4). In areas without at least 1,000 acres of commercial citrus, the infection rate will be less than that seen in Temecula and will average 1% per year.
- n) Pesticide sprays will be applied to protect the grapes and these sprays combined with pruning and the removal of dead or dying vines will prevent the infection rate from exceeding an average of 5% per year.
- o) The rate of increase in incidence of Pierce's disease will double each year from current levels until it reaches its maximum rate in four to six years (Table 7).
- p) Vines will become infected in year one, chronically infected in year two, and die in year three. Yields from infected vines will decrease 15% in year one, 50% in year two and 100% in year three. Replacement vines will yield no grapes in years one and two after planting, 12.5% of full yield in year three, 50% of full yield in year four and full production in year five (University of California Cooperative Extension Sample Costs to Establish a Vineyard and Produce Wine Grapes 1998; Dr. J. Siebert, University of California, pers. comm.).

## Grape Management Practices

- q) Growers will pull and replace chronically infected vines after the death rate in the vineyard equals or exceeds 1%. Once growers begin to pull chronically infected vines they will continue to do so. Pesticide sprays will be applied to protect the vines. These sprays, combined with the removal of chronically infected vines, will prevent the infection rate from exceeding 5% per year.
- r) Vine replacement costs average \$2,979 per acre and include the cost of plants, planting, replanting new vines that die, suckering, pruning and shoot position work, and training (University of California Cooperative Extension Sample Costs to Establish a Vineyard). Many of the costs normally associated with establishing a vineyard (trellis installation, ground preparation, survey and layout, weed control, etc.) are not included because the vineyard is already in place and these costs either have already been incurred or will be incurred as regular management practices of the established vines.
- s) Pesticide sprays will be used to attempt to reduce or control the impact of Pierce's disease. The major options are foliar sprays and drip application of a systemic insecticide. At this point there are no data on which to base a determination about which is the better approach. What data are available suggest that imidacloprid products will be among the materials of choice. The cost to treat an acre of grapes with a foliar imidacloprid product is \$44 and two sprays will be needed, based on experience in the Pierce's Disease Control Program. The cost for a drip treatment of the systemic imidacloprid product is \$76.80 per acre per treatment (Dr. J. Siebert, University of California, pers. comm.). Because a systemic treatment may give up to six months of control, and the cost of a single drip treatment is less than two foliar treatments, it is assumed that systemic treatments will be the choice of the growers. It is likely that the drip imidacloprid treatment will also control other leafhopper and mite

pests, and thus may reduce pesticide use in the vineyards and the over-all cost of pest control. This possibility needs further investigation.

### **Alfalfa Dwarf**

- t) There are insufficient data to make any predictions about the potential impact of GWSS on the epidemiology of alfalfa dwarf in California.
- u) Should GWSS transmission of *Xf* result in an increased incidence of alfalfa dwarf, the result could be large given the 1,102,000 acres of alfalfa in the state (Table 4).
- v) If GWSS achieves large numbers in alfalfa, the crop could become a significant reservoir for *Xf* strains causing both Pierce's disease and almond leaf scorch in counties with more than 1,000 acres of alfalfa leading to greater levels of these diseases.
- w) The primary effect of alfalfa dwarf is a rapid (3 to 5 year) dwindling of productivity.

**Table 4. Almond, citrus, grape, and alfalfa acreage by county<sup>d</sup>**

County	Acres almonds	Acres citrus	Acres grapes	Acres alfalfa
Alameda			2,018	480
Amador			2,831 <sup>c</sup>	434
Butte	37,207	147 <sup>b</sup>		2,466
Calaveras			320 <sup>c</sup>	
Colusa	20,550			8,350
Contra Costa			1,580	3,500
El Dorado			981 <sup>c</sup>	
Fresno	57,125	28,737	228,610	81,500
Glenn	22,562	714 <sup>b</sup>	835	14,236
Imperial		4,253		172,771
Inyo <sup>a</sup>				3,900
Kern	88,947	4,3531	88,283	128,000
Kings	1,959		4,340	50,193
Lake			4,107	188
Lassen <sup>a</sup>				32,000
Los Angeles			79	6,056
Madera	46,200	600 <sup>b</sup>	92,230	37,810
Marin			91	
Mariposa			68	
Mendocino			12,283	
Merced	77,461		16,200	77,119
Modoc <sup>a</sup>				31,000
Mono <sup>a</sup>				6,800
Monterey		925 <sup>b</sup>	34,187	995
Napa			30,506	
Nevada			201 <sup>c</sup>	
Orange		857		
Placer		93 <sup>b</sup>	76 <sup>c</sup>	
Plumas <sup>a</sup>				4,900
Riverside		30,757	15,295	60,351
Sacramento			22,630	6,953
San Benito			2,494	1,275
San Bernardino		5,920	1210	14,910
San Diego		15,946	189	
San Joaquin	41,200		82,962	64,200
San Luis Obispo		1,428	16,272	3,165
San Mateo			40	
Santa Barbara		1,829	14,064	1,466
Santa Clara			1,600	600
Santa Cruz			260	
Shasta				6,800
Sierra <sup>a</sup>				1,100
Siskiyou <sup>a</sup>				52,700
Solano	1,506		3,390	29,571
Sonoma			42,227	
Stanislaus	88,400		13,900	39,200
Sutter	4,476			5,802
Tehama	6,175			4,300
Tulare	16,009	138,237	81,334	103,000
Ventura		36,758		
Yolo	5,612		8,704	43,024
Yuba	1,181		350	705

a. Not expected to have a GWSS-*Xylella* problem due to winter temperatures

b. Citrus acreage considered too small to substantially influence GWSS population dynamics

c. Grape acreage may be outside potential range of GWSS and thus not included in impact analysis

d. Data taken from 1999 County Agricultural Commissioners Report

**Table 5. Kern County Almond and Grape Acreage Susceptible to Increased Disease Incidence Due to GWSS.**

<b>Acres at Risk by Year<sup>a</sup></b>					
<b>Crop</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Almond	17,789	35,579	53,368	71,157	88,947
Grape	17,657	35,313	52,970	70,627	88,283

a. Assumes that it takes GWSS five unfettered years to spread throughout the county.

**Table 6. Percent of plants showing symptoms under high and low impact scenarios over a six-year period.**

<b>Percent Infected Plants Per Year<sup>a</sup></b>						
<b>Impact</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
Low	0.125 <sup>a</sup>	0.25	0.5	1.0	1.0	1.0
High	0.15 <sup>a</sup>	0.31	0.63	1.25	2.5	5.0

a. Assumed disease background rate

**Table 7. Almond and Grape Acreage in California North of San Bernardino, Los Angeles, Ventura and Santa Barbara County Lines (Exclusive of Kern County) Susceptible to Increased Disease Incidence Due to GWSS by Year.**

<b>Acres at Risk by Year<sup>a</sup></b>										
<b>Crop</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>	<b>Year 8</b>	<b>Year 9</b>	<b>Year 10</b>
Almond High risk	7,313	14,626	21,939	29,252	36,565	43,878	51,191	58,504	65,817	73,134
Almond Low risk	35,449	70,898	106,347	141,796	177,245	212,694	248,143	283,592	319,041	354,489
Grape High risk	35,697	71,394	107,091	142,788	178,485	214,182	249,879	285,576	321,273	356,974
Grape Low risk	37,708	75,416	113,124	150,832	188,540	226,248	263,956	301,664	339,372	377,081

a. Assumes that it takes GWSS ten unfettered years to spread throughout the state

## Description Of Losses To California Grapes From *Xf*

Losses due to GWSS-vectored *Xf* build-up slowly until the death rate of infected vines reaches or exceeds 1%. At this time the growers will pull the dead vines and those vines showing symptoms of a chronic infection. In the future, the growers will pull 1 to 5% of their vines per season as they die and another 1% to 5% showing chronic PD infection. The rate of removed vines will increase until an equilibrium is established about 19 years after the infection begins to spread. This delay is due to the time it will take for the GWSS to spread and the delay in the build-up of diseased vines (Tables 8, 9, 10). The loss of vines in the low risk counties ranges from none to 706 acres per year for vine death and from none to 3,771 acres for chronically infected vines. In the high-risk counties, the rates vary from none to 669 acres of dead vines per year at a 1% disease incidence and none to 838 acres at a 5% disease incidence. Removal of chronically infected vines ranges from none to 3,570 acres per year at an average 1% disease incidence and none to 17,850 acres per year at an average 5% disease incidence.

Crop losses are due to the reduced yields of diseased vines over a three-year period from infection until death and the delay in the maturation of the replacement vines as they grow. For this analysis, the dead vines are replaced at the beginning of the growing season giving a period of six years with either declining or increasing yields (Tables 8, 9, 10). Crop losses range from none to the equivalent of 13,293 acres of grapes for those vineyards in the low-risk counties. For the high-risk counties, the yield losses range from none to 12,584 acres for an average 1% disease incidence and none to 62,966 acres for an average 5% disease incidence.

Pesticide treatments will begin the season when 1% or more of the vines die and they will continue forever. Increased treatment costs may be balanced by reducing the number of sprays currently used for control of grape and variegated leafhoppers and mites. This needs to be investigated (Tables 8, 9, 10). Treatment costs are based on a per acre rate and thus are independent of the severity of the infection. For the low risk vineyards they are estimated at \$29,000,000 and for the high-risk vineyards at \$27,000,000 (Tables 8, 9, 10).

The trends in Kern County are the same except that the time frame for the GWSS to infest the entire county is five years. The acres of vines dying per year ranges from none to 331 acres at an average 1% disease incidence and up to 415 acres at an average 5% disease incidence. The acres of chronically-infected vines removed ranges from none to 885 acres at an average 1% disease incidence and up to 4,415 acres at an average 5% disease incidence (Tables 11, 12).

Total yield losses in Kern County range up to 2,102 acres at an average 1% disease incidence and up to 10,486 at an average 5% disease incidence. Treatment costs range up to \$6,800,000 per year (Tables 11, 12).

Total treatment costs for all susceptible grapes will range from none up to \$63,000,000 per year. As noted earlier, there may be reductions in the current treatment programs for other leafhoppers and mites that can compensate for some or all of this cost. This needs to be investigated (Table 13).

The annual cost to replace vines that have died or that have a chronic Pierce's disease infection range from none up to \$24,500,000 with a chronic, average 1% disease incidence throughout the susceptible vineyards in California. At a chronic, average 5% disease incidence rate in the high-risk counties, the upper end costs increase to \$77,600,000 per year. As noted earlier, these costs include the cost to remove the dead vine, buy new vines, plant the new vines and train them into the proper growing configuration (Tables 14-15).

Overall annual crop losses due to reduced yields of dying vines and the time it takes new vines to reach full yield range from \$84,280,000 up to \$142,084,000 with a chronic, average disease incidence of 1% throughout the susceptible grape acreage. If the disease incidence gets to a chronic, average 5% level in the high-risk counties, the upper estimate increases to \$449,928,000 per year (Tables 16-17). Note that the crop losses occur over a six-year period between a fully producing vine that gets a lethal infection and the maturation of a new replacement vine.

Total annual costs to the grape growers when the GWSS spreads throughout its biological range in California range from \$230,000,000 at a chronic, average 1% disease incidence up to \$591,000,000 if the disease incidence in the high-risk counties reaches a chronic, average 5% (Tables 18-19).

### **Caveats About These Numbers**

This analysis is based on the assumptions given above and represents what seems a reasonable scenario at this time. Further data will allow us to refine these projections. There are several currently unresolved questions that bear on the final impact of the GWSS on California. Among the questions we need to answer are:

- 1) Whether GWSS will be able to breed to high numbers outside of citrus orchards.
- 2) Whether GWSS will breed to high numbers in almond orchards or if they will invade in large numbers from nearby vegetation.
- 3) Whether GWSS will breed or feed in alfalfa fields.
- 4) Whether GWSS will transmit *Xf* from alfalfa into grapes and almonds.
- 5) Whether GWSS will breed to large numbers in the urban areas of northern California and if they do, whether the pest will move from the urban areas into nearby crops.
- 6) Whether GWSS will create new pathogen-host associations as seen in oleander.
- 7) Whether GWSS will increase the severity of *Xf*-caused disease in other native plants such as oaks and maples.
- 8) Whether there is a simple, effective management system for GWSS that will reduce the transmission of *Xf*.

### **What Can Be Done to Reduce the Risk Posed By GWSS**

At present, although ongoing program activities have shown that chemical insecticides can reduce GWSS populations, there are no proven, effective measures that will reduce GWSS numbers below the point where the pest does not represent a threat of increasing the spread of *Xf*. There are some options that are being investigated and perhaps one or more will provide the needed protection. The true solution is to develop one or more methods to deal with the pathogen. Below are brief discussions about the potential measures.

**Biological Control.** The use of predators, parasites, or pathogens to control pest populations below damaging levels has a long and successful history in California. There are GWSS predators and parasites in both Mexico and the southeastern United States. At present, they are not able to reduce the populations of the GWSS below levels at which they are not an important vector of the pathogen. This is demonstrated by the inability to grow *Vitis vinifera* grapes in these regions despite numerous attempts to do so.

California has both a different climate and a different cropping system than Mexico or the southeastern United States. Egg parasites of the GWSS have been imported and released in 2000 and in 2001. As noted above, the chances of complete biological control that eliminates GWSS as an important vector of *Xf* are slim. However, any and all permanent reductions in GWSS numbers will help slow the potential impacts of the pest and may increase the effectiveness of other control measures.

**Cultural Controls.** The use of cultural controls against GWSS is a new area with no data to support any of the ideas being put forth. Measures being tested include barriers, trap crops and extensive removal of infected vines. It may be several years before the results are gathered and analyzed.

**Repellents.** It is possible that kaolin-based repellents may deter GWSS from entering and feeding on crops. This idea is being tested. It is also possible that the opposite might occur, with untreated foliage eliciting a very strong attraction for the GWSS. If repellents increase plant-to-plant movements of GWSS, this may increase the transmission rate of *Xf*.

**“Softer Pesticides.”** Less environmentally damaging pesticides than the standard organophosphates and carbamates might be an option for GWSS control. At least one, extracts of neem, has not proven effective against GWSS. University of California researchers will test other “softer pesticides” during 2001.

**Pesticide Treatments.** At present, synthetic organic pesticides offer the best means for GWSS control but it is unclear whether any one or a group of such materials can reduce the transmission of the pathogen by GWSS to acceptable levels. Treatment programs are being tested in Temecula, Riverside County and the General Beale Road area, Kern County.

**Integrated Pest Management (IPM) Programs.** IPM programs are being tested for use against GWSS. All incorporate some form of area-wide control of the pest designed to treat the leafhopper in crops where they breed and lower the numbers of GWSS entering the grape agro-ecosystem. It is unclear if any will be effective or feasible. These area-wide programs include the judicious use of pesticides against GWSS.

Texas A & M University advocates an IPM approach to managing grapevine death from *Xf* (Kamas et al. 2000). The IPM program recommends pesticide sprays, buffer zones around vineyards, planting away from areas where the vectors breed and removal of infected grapevines from the vineyard. Despite these efforts, Texas grape growers have lost millions of dollars due to *Xf* infection of their vines. As a result, the growers have moved grape production into areas unaffected by *Xf* (Kamas et al. 2000).

## Biological Impediments to GWSS Management in Commercial Crops

There are a number of biological impediments to developing a good, effective management program that reduces GWSS transmission of *Xf* to acceptable levels (Table 3). In summary, GWSS breeds on a wide range of plants in both the agricultural and residential setting and moves among these plants on a daily, weekly and seasonal level. GWSS can acquire *Xf* from a number of plant species and adults remain infective for life after acquiring the pathogen. GWSS builds up to large numbers on plants not susceptible to the pathogen and then invades plantings of susceptible plants in large numbers.

These attributes make it difficult to stop GWSS-mediated pathogen transmission merely by treating susceptible plants, because the pest can invade the planting in large numbers and infect the hosts before the insecticide residues kill the vectors. At present, the key to GWSS management in commercial crops is to prevent their build up at early season breeding sites. This will reduce the potential for GWSS dispersal, lower the numbers of sharpshooters that leave their breeding sites for susceptible hosts, and should lower the incidence of *Xf* transmission.

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**Table 8. Acres of northern California low risk grapes infected, killed or removed per year due to *Xylella fastidiosa* at a chronic, average 1% disease incidence.**

<i>Year</i>	<i>Acres exposed</i>	<i>New acres infected</i>	<i>Acres of vines with chronic infection</i>	<i>Acres of dead vines</i>	<i>Acres of vines with chronic infection removed</i>	<i>Acre equivalent of yield loss for dead or diseased vines<sup>a,d</sup></i>	<i>Acre equivalent of reduced yield for new vines<sup>b</sup></i>	<i>Acre equivalent of total yield losses</i>	<i>Dollar cost to treat crop with a pesticide<sup>c</sup></i>
1	37,710	47	0	0	0	7.1	0	7.1	0
2	75,420	141	47	0	0	44.7	0	44.7	0
3	113,130	329	141	47	0	166.9	0	166.9	0
4	150,840	706	329	141	0	411.4	47	458.4	0
5	188,550	1,083	706	329	0	844.5	182.1	1,026.6	0
6	226,260	1,460	1,083	706	377	1655	475.9	2,130.9	2,896,128
7	263,970	1,837	1,460	706	754	2,088.6	1,441.4	3530	5,792,256
8	301,680	2,214	1,837	706	1,131	2,522.1	2,572.1	5,094.2	8,688,384
9	339,390	2,591	2,214	706	1,508	2,955.7	3656	6,611.7	11,584,512
10	377,100	2,968	2,591	706	1,885	3,389.2	4,551.4	7,940.6	14,480,640
11	377,100	3,298	2,968	706	2,262	3,815.7	5,446.8	9,262.5	17,376,768
12	377,100	3,581	3,298	706	2,639	4,211.7	6,153.6	10,365.3	20,272,896
13	377,100	3,771	3,581	659	3,016	4,523.2	7,237.5	11,769.7	23,169,024
14	377,100	3,771	3,771	565	3,393	4,712.2	8,085.9	12,798.1	26,065,152
15	377,100	3,771	3,771	377	3,771	4,713.7	8,846.1	13,559.8	28,961,280
16	377,100	3,771	3,771	0	3,771	4,336.7	9,448.8	13,785.5	28,961,280
17	377,100	3,771	3,771	0	3,771	4,336.7	9,379.5	13,716.2	28,961,280
18	377,100	3,771	3,771	0	3,771	4,336.7	9,144.6	13,481.3	28,961,280
19	377,100	3,771	3,771	0	3,771	4,336.7	8,956.1	13,292.8	28,961,280

- a. For the established vine, calculated as 15% crop loss the year infected, 50% loss the first year of chronic infection and 100% crop loss for the year of death or removal (Siebert, pers. comm.)
- b. For the replacement vine, calculated as 100% yield reduction year planted which is the same year the established vine died or was removed (acres not counted here, counted in loss due to acres died/removed in footnote “a”), 100% yield reduction year 2, 87.5% reduction year three, 50% yield reduction year four; assume full production in year five (University of California Cooperative Extension, *Sample Costs to Establish a Vineyard and Produce Wine Grapes*, 1998).
- c. Calculated as \$76.80 per acre per year (Siebert, pers. comm.). Treatments start when death rate of vines equals or exceeds 1% per year and continues annually thereafter.
- d. Yield losses are converted from pounds of grapes into the number of acres that must be lost to equal the same amount of grapes. This is done throughout these tables.

**Table 9. Acres of northern California high-risk grapes infected, killed or removed per year due to *Xylella fastidiosa* infection at a chronic, average 1% disease incidence.**

Year	Acres exposed	New acres infected	Acres of vines with chronic infection	Acres of dead vines	Acres of vines with chronic infection removed	Acre equivalent of yield loss <sup>a</sup>	Acre equivalent of reduced yield for new vines <sup>b</sup>	Acre equivalent of total yield losses	Dollar cost to treat crop with a pesticide <sup>c</sup>
1	35,700	45	0	0	0	6.8	0	6.8	0
2	71,400	134	45	0	0	42.6	0	42.6	0
3	107,100	312	134	45	0	158.8	0	158.8	0
4	142,800	669	312	134	0	448.8	45	493.8	0
5	178,500	1,026	669	312	0	800.4	173.4	973.8	0
6	214,200	1,383	1,026	669	357	1,568	451.8	2,019.8	2,741,760
7	249,900	1,740	1,383	669	714	1,978.5	1,321	3,299.5	5,483,520
8	285,600	2,097	1,740	669	1,071	2,389.1	2,397.4	4,786.5	10,967,040
9	321,300	2,454	2,097	669	1,428	2,431.5	3,440.7	5,872.2	13,708,800
10	357,000	2,811	2,454	669	1,785	3,210.2	4,311	7,521.2	16,450,560
11	357,000	3,123	2,811	669	2,142	3,614	5,158.9	8,772.9	19,192,330
12	357,000	3,391	3,123	669	2,499	3,988.7	6,006.8	9,995.5	21,934,080
13	357,000	3,570	3,391	624	2,856	4,283	6,854.6	11,137.6	24,675,840
14	357,000	3,570	3,570	535	3,213	4,462	7,657.5	12,119.5	27,417,600
15	357,000	3,570	3,570	357	3,570	4,462.5	8,377	12,839.5	27,417,600
16	357,000	3,570	3,570	0	3,570	4,105.5	8,946.5	13,052	27,417,600
17	357,000	3,570	3,570	0	3,570	4,105.5	8,880.1	12,985.6	27,417,600
18	357,000	3,570	3,570	0	3,570	4,105.5	8,657.3	12,762.8	27,417,600
19	357,000	3,570	3,570	0	3,570	4,105.5	8,478.8	12,584.3	27,417,600

- a. For the established vine, calculated as 15% crop loss the year infected, 50% loss the first year of chronic infection and 100% crop loss for the year of death or removal (Siebert, pers. comm.)
- b. For the replacement vine, calculated as 100% yield reduction year planted which is the same year the established vine died or was removed (acres not counted here, counted in loss due to acres died/removed in footnote “a”), 100% yield reduction year 2, 87.5% reduction year three, 50% yield reduction year four; assume full production in year five (University of California Cooperative Extension, *Sample Costs to Establish a Vineyard and Produce Wine Grapes*, 1998).
- c. Calculated as \$76.80 per acre per year (Siebert, pers. comm.). Treatments start when death rate of vines equals or exceeds 1% per year and continues annually thereafter.

**Table 10. Acres of northern California high-risk grapes infected, killed or removed per year due to *Xylella fastidiosa* at a chronic, average 5% disease incidence.**

Year	Acres exposed	New acres infected	Acres of vines with chronic infection	Acres of dead vines	Acres of vines with chronic infection removed	Acres equivalent of yield loss for dead or diseased vines <sup>a</sup>	Acres equivalent of reduced yield for new vines <sup>b</sup>	Acres equivalent of total yield losses	Dollar cost to treat crop with a pesticide <sup>c</sup>
1	35,700	57	0	0	0	8.6	0	8.6	0
2	71,400	171	57	0	0	54.2	0	54.2	0
3	107,100	392	171	57	0	201.3	0	201.3	0
4	142,800	838	392	171	0	492.7	57	549.7	0
5	178,500	1,731	838	392	0	1,070.7	220.9	1,291.6	0
6	214,200	3,516	1,731	838	893	2,677.4	570.1	3,247.5	2,741,760
7	249,900	5,301	3,515	838	2,678	4,703.2	2,159.5	6,862.7	5,483,520
8	285,600	7,086	5,299	838	4,463	6,782.9	5,226.6	12,009.5	10,967,040
9	321,300	8,871	7,083	838	6,248	8,835.7	9,243	18,078.7	13,708,800
10	357,000	10,656	8,867	838	8,033	10,469.4	13,482.4	23,951.8	16,450,560
11	357,000	12,384	10,651	838	9,818	12,932.6	17,721.2	30,653.8	19,192,330
12	357,000	14,005	12,378	838	11,603	14,932.3	21,961.1	36,893.3	21,934,080
13	357,000	15,619	14,048	781	13,388	16,845.4	26,200.5	43,045.9	24,675,840
14	357,000	16,958	15,611	667	15,173	18,606.7	30,362.9	48,969.6	27,417,600
15	357,000	17,850	16,949	446	16,958	20,081.5	34,458.4	54,539.9	27,417,600
16	357,000	17,850	17,850	0	17,850	20,527.5	38,348.5	58,606	27,417,600
17	357,000	17,850	17,850	0	17,850	20,527.5	40,998.5	61,571	27,417,600
18	357,000	17,850	17,850	0	17,850	20,527.5	42,170.8	62,698.3	27,417,600
19	357,000	17,850	17,850	0	17,850	20,527.5	42,393.8	62,966.3	27,417,600

- a. For the established vine, calculated as 15% crop loss the year infected, 50% loss the first year of chronic infection and 100% crop loss for the year of death or removal (Siebert, pers. comm.)
- b. For the replacement vine, calculated as 100% yield reduction year planted which is the same year the established vine died or was removed (acres not counted here, counted in loss due to acres died/removed in footnote “a”), 100% yield reduction year 2, 87.5% reduction year three, 50% yield reduction year four; assume full production in year five (University of California Cooperative Extension, *Sample Costs to Establish a Vineyard and Produce Wine Grapes*, 1998).
- c. Calculated as \$76.80 per acre per year (Siebert, pers. comm.). Treatments start when death rate of vines equals or exceeds 1% per year and continues annually thereafter.

**Table 11. Acres of Kern County grapes infected, killed or removed per year due to *Xylella fastidiosa* at a chronic, average 1% disease incidence.**

Year	Acres exposed	New acres infected	Acres of vines with chronic infection	Acres of dead vines	Acres of vines with chronic infection removed	Acre equivalent of yield loss for dead or diseased vines <sup>a</sup>	Acre equivalent of reduced yield for new vines <sup>b</sup>	Acre equivalent of total yield losses	Dollar cost to treat crop with pesticide <sup>c</sup>
1	17,657	22	0	0	0	3.3	0	3.3	0
2	35,313	66	22	0	0	20.9	0	20.9	0
3	52,970	154	66	22	0	78.1	0	78.1	0
4	70,627	331	154	66	0	192.7	22	214.7	0
5	88,283	508	331	154	0	395.7	85.3	481.0	0
6	88,283	663	353	331	177	773	222.8	995.8	1,356,058
7	88,283	796	530	331	354	958.9	675.8	1,634.7	2,712,038
8	88,283	885	707	309	531	1,105.3	1,206.5	2,311.8	4,06,896
9	88,283	885	885	265	708	1,194.3	1,693.4	2,887.7	5,424,154
10	88,283	885	885	177	885	1,062	2,050.5	3,112.5	6,780,134
11	88,283	885	885	0	885	1,017.8	2,333.4	3,351.2	6,780,134
12	88,283	885	885	0	885	1,017.8	2,300.8	3,318.6	6,780,134
13	88,283	885	885	0	885	1,017.8	2,190.4	3,208.2	6,780,134
14	88,283	885	885	0	885	1,017.8	2,101.9	3,119.7	6,780,134
15	88,283	885	885	0	885	1,017.8	2,101.9	3,119.7	6,780,134

- a. For the established vine, calculated as 15% crop loss the year infected, 50% loss the first year of chronic infection and 100% crop loss for the year of death or removal (Siebert, pers. comm.)
- b. For the replacement vine, calculated as 100% yield reduction year planted which is the same year the established vine died or was removed (acres not counted here, counted in loss due to acres died/removed in footnote “a”), 100% yield reduction year 2, 87.5% reduction year three, 50% yield reduction year four; assume full production in year five (University of California Cooperative Extension, *Sample Costs to Establish a Vineyard and Produce Wine Grapes*, 1998).
- c. Calculated as \$76.80 per acre per year (Siebert, pers. comm.). Treatments start when death rate of vines equals or exceeds 1% per year and continues annually thereafter.

**Table 12. Acres of Kern County grapes infected, killed or removed per year due to *Xylella fastidiosa* at a chronic, average 5% disease incidence**

Year	Acres exposed	New acres infected	Acres of vines with chronic infection	Acres of dead vines	Acres with chronic infection removed	Acres equivalent of yield loss for dead or diseased vines <sup>a</sup>	Acres equivalent of reduced yield for new vines <sup>b</sup>	Acres equivalent of total yield losses	Dollar cost to treat crop with a pesticide <sup>c</sup>
1	17,657	28	0	0	0	4.2	0	4.2	0
2	35,313	83	28	0	0	26.5	0	26.5	0
3	52,970	194	83	28	0	108.6	0	108.6	0
4	70,627	415	194	83	0	242.3	28.0	270.3	0
5	88,283	857	415	194	0	530.1	107.5	637.6	0
6	88,283	1,712	857	415	442	1,321.3	280.6	1,601.9	1,356,058
7	88,283	2,540	1,740	415	1,325	2,314.5	1,068.3	3,382.8	2,712,038
8	88,283	3,312	2,595	387	2,208	3,257.8	2,586.9	5,844.7	4,068,096
9	88,283	3,974	3,423	332	3,091	4,129.6	4,546.0	8,675.6	5,424,154
10	88,283	4,415	4,195	221	3,974	4,857.3	6,563.6	11,420.9	6,780,134
11	88,283	4,415	4,415	0	4,415	5,077.3	8,487.6	13,564.9	6,780,134
12	88,283	4,415	4,415	0	4,415	5,077.3	9,797.1	14,874.4	6,780,134
13	88,283	4,415	4,415	0	4,415	5,077.3	10,375.6	15,452.9	6,780,134
14	88,283	4,415	4,415	0	4,415	5,077.3	10,485.6	15,562.9	6,780,134
15	88,283	4,415	4,415	0	4,415	5,077.3	10,485.6	15,562.9	6,780,134

- a. For the established vine, calculated as 15% crop loss the year infected, 50% loss the first year of chronic infection and 100% crop loss for the year of death or removal (Siebert, pers. comm.)
- b. For the replacement vine, calculated as 100% yield reduction year planted which is the same year the established vine died or was removed (acres not counted here, counted in loss due to acres died/removed in footnote "a"), 100% yield reduction year 2, 87.5% reduction year three, 50% yield reduction year four; assume full production in year five (University of California Cooperative Extension, *Sample Costs to Establish a Vineyard and Produce Wine Grapes*, 1998).
- c. Calculated as \$76.80 per acre per year (Siebert, pers. comm.). Treatments start when death rate of vines equals or exceeds 1% per year and continues annually thereafter.

**Table 13. Summary of pesticide treatment costs\***

<i>Year</i>	<i>Kern County Cost to treat crop with a pesticide</i>	<i>High risk acreage Cost to treat crop with a pesticide</i>	<i>Low risk acreage Cost to treat crop with a pesticide</i>	<i>Total pesticide treatment costs(\$)</i>
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	1,356,058	2,741,760	2,896,128	6,993,946
7	2,712,038	5,483,520	5,792,256	13,987,814
8	4,068,096	10,967,040	8,688,384	23,723,520
9	5,424,154	13,708,800	11,584,512	30,717,466
10	6,780,134	16,450,560	14,480,640	37,711,334
11	6,780,134	19,192,330	17,376,768	43,349,232
12	6,780,134	21,934,080	20,272,896	48,987,110
13	6,780,134	24,675,840	23,169,024	54,624,998
14	6,780,134	27,417,600	26,065,152	60,262,886
15	6,780,134	27,417,600	28,961,280	63,159,014
16	6,780,134	27,417,600	28,961,280	63,159,014
17	6,780,134	27,417,600	28,961,280	63,159,014
18	6,780,134	27,417,600	28,961,280	63,159,014
19	6,780,134	27,417,600	28,961,280	63,159,014

\* Data taken from previous tables

**Table 14. Summary of the acres lost to disease through vine death or removal by year<sup>a</sup>**

<i>Year</i>	<i>High risk at an average 1% disease incidence Acres dead</i>	<i>High risk at an average 1% disease incidence Chronic acres removed</i>	<i>Kern County at an average 1% disease incidence Acres dead</i>	<i>Kern County at an average 1% disease incidence Chronic acres removed</i>	<i>Low risk at an average 1% disease incidence Acres dead</i>	<i>Low risk at an average 1% disease incidence Chronic acres removed</i>	<i>Total acres lost per year</i>	<i>Cost to replace lost acreage<sup>b</sup></i>
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	45	0	22	0	47	0	114	339,606
4	134	0	66	0	141	0	341	1,015,839
5	312	0	154	0	329	0	795	2,368,305
6	669	357	331	177	706	377	2,617	7,796,043
7	669	714	331	354	706	754	3,528	10,509,912
8	669	1,071	309	531	706	1,131	4,417	13,158,243
9	669	1,428	265	708	706	1,508	5,284	15,741,036
10	669	1,785	177	885	706	1,885	6,107	18,192,753
11	669	2,142	0	885	706	2,262	6,664	19,852,056
12	669	2,499	0	885	706	2,639	7,398	22,038,642
13	624	2,856	0	885	659	3,016	8,040	23,951,160
14	535	3,213	0	885	565	3,393	8,591	25,592,589
15	357	3,570	0	885	377	3,771	8,960	26,691,840
16	0	3,570	0	885	0	3,771	8,226	24,505,254

<sup>a</sup> Average cost of \$2979 to replace an acre of grapes (average of costs taken from University of California Cooperative Extension Sample Costs to Establish a Vineyard and Produce Grapes). Costs incurred over first two years after replanting.

<sup>b</sup> Data taken from previous tables.

**Table 15. Summary of the acres lost to disease through vine death or removal by year<sup>a</sup>**

<i>Year</i>	<i>Low risk at an average 1% disease incidence acres dead</i>	<i>Low risk at an average 1% disease incidence Chronic acres removed</i>	<i>Kern County at an average 5% disease incidence acres dead</i>	<i>Kern County at an average 5% disease incidence Acres with chronic infection removed</i>	<i>High risk at an average 5% disease incidence acres dead</i>	<i>High risk at an average 5% disease incidence Chronic acres removed</i>	<i>Total acres lost</i>	<i>Cost to replace lost acreage<sup>b</sup></i>
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	47	0	28	0	57	0	132	393,228
4	141	0	83	0	171	0	395	1,176,705
5	329	0	194	0	392	0	915	2,725,785
6	706	377	415	442	838	893	3,671	10,935,909
7	706	754	415	1,325	838	2,678	6,716	20,006,964
8	706	1,131	387	2,208	838	4,463	9,733	28,994,607
9	706	1,508	332	3,091	838	6,248	12,733	37,931,607
10	706	1,885	221	3,974	838	8,033	15,657	46,642,203
11	706	2,262	0	4,415	838	9,818	18,039	57,738,181
12	706	2,639	0	4,415	838	11,603	20,201	60,178,779
13	659	3,016	0	4,415	781	13,388	22,259	66,309,561
14	565	3,393	0	4,415	667	15,173	24,213	72,130,527
15	377	3,771	0	4,415	446	16,958	25,967	77,355,693
16	0	3,771	0	4,415	0	17,850	26,036	77,561,244

<sup>a</sup> Average cost of \$2979 to replace an acre of grapes (average of costs taken from University of California Cooperative Extension Sample Costs to Establish a Vineyard and Produce Grapes). Costs incurred over first two years after replanting.

<sup>b</sup> Data taken from previous tables.

**Table 16. Summary of value of lost crop with a statewide average 1% chronic Pierce's disease incidence<sup>a</sup>**

<i>Year</i>	<i>Low risk at an average 1% disease incidence yield losses in acres</i>	<i>High risk at an average 1% disease incidence yield losses in acres</i>	<i>Kern County at an average 1% disease incidence yield losses in acres</i>	<i>Total yield loss in acres at an average 1% disease incidence in state</i>	<i>Value of lost crop<sup>b</sup></i>
1	7.1	6.8	3.3	17.2	84,280
2	44.7	42.6	20.9	108.2	530,180
3	166.9	158.8	78.1	403.8	1,978,620
4	458.4	493.8	214.7	1,166.9	5,717,810
5	1,026.6	973.8	481	2,481.4	12,158,860
6	2,130.9	2,019.8	995.8	5,146.5	25,217,850
7	3,530	3,299.5	1,634.7	8,464.2	41,474,580
8	5,094.2	4,786.5	2,311.8	12,192.5	59,743,250
9	6,611.7	5,872.2	2,887.7	15,371.6	75,320,840
10	7,940.6	7,521.2	3,112.5	18,574.3	91,014,070
11	9,262.5	8,772.9	3,351.2	21,386.6	104,794,340
12	10,365.3	9,995.5	3,318.6	23,679.4	116,029,060
13	11,769.7	11,137.6	3,208.2	26,115.5	127,965,950
14	12,798.1	12,119.5	3,119.7	28,037.3	137,382,770
15	13,559.8	12,839.5	3,119.7	29,519	144,643,100
16	13,785.5	13,052	3,119.7	29,957.2	146,790,280
17	13,716.2	12,985.6	3,119.7	29,821.5	146,125,350
18	13,481.3	12,762.8	3,119.7	29,363.8	143,882,620
19	13,292.8	12,584.3	3,119.7	28,996.8	142,084,320

<sup>a</sup> Data taken from previous tables.

<sup>b</sup> Assumes a yield of 7 tons per acre and a value of \$700 per ton for a total value of \$4,900 per acre (average of data taken from County Agricultural Commissioners' Data 1999).

**Table 17. Summary of crop losses with a 5% Pierce's disease incidence in Kern County and the high-risk areas<sup>a</sup>.**

<i>Year</i>	<i>Low risk at an average 1% disease incidence yield losses in acres</i>	<i>High risk at an average 5% disease incidence yield losses in acres</i>	<i>Kern County at an average 5% disease incidence yield losses in acres</i>	<i>Total yield reduction in acres at an average 5% disease incidence in high risk/Kern County</i>	<i>Value of lost crop<sup>b</sup> with an average 5% disease incidence in high risk/Kern County</i>
1	7.1	8.6	4.2	19.9	97,510
2	44.7	54.2	26.5	125.4	614,460
3	166.9	201.3	108.6	476.8	2,336,320
4	458.4	549.7	270.3	1,278.4	6,264,160
5	1,026.6	1,291.6	637.6	2,955.8	14,483,420
6	2,130.9	3,247.5	1,601.9	6,980.3	34,203,470
7	3,530	6,862.7	3,382.8	13,775.5	67,499,950
8	5,094.2	12,009.5	5,844.7	22,948.4	112,447,160
9	6,611.7	18,078.7	8,675.6	33,366.0	163,493,400
10	7,940.6	23,951.8	11,420.9	43,313.3	212,235,170
11	9,262.5	30,653.8	13,564.9	53,481.2	262,057,880
12	10,365.3	36,893.3	14,874.4	62,133	304,451,700
13	11,769.7	43,045.9	15,452.9	70,268.5	344,315,650
14	12,798.1	48,969.6	15,562.9	77,330.6	378,919,940
15	13,559.8	54,539.9	15,562.9	83,662.6	409,946,740
16	13,785.5	58,606.0	15,562.9	87,954.4	430,976,560
17	13,716.2	61,571.0	15,562.9	90,850.1	445,165,490
18	13,481.3	62,698.3	15,562.9	91,742.5	449,538,250
19	13,292.8	62,966.3	15,562.9	91,822.0	449,927,800

<sup>a</sup> Data taken from previous tables.

<sup>b</sup> Assumes a yield of 7 tons per acre and a value of \$700 per ton for a total value of \$4,900 per acre (average of data taken from County Agricultural Commissioners' Data 1999).

**Table 18. Summary of losses to grape growers with a statewide average 1% chronic *X. fastidiosa* disease incidence \***

<i>Year</i>	<i>Cost to replace lost acreage</i>	<i>Value of lost crop</i>	<i>Total pesticide treatment costs</i>	<i>At an average 1% disease incidence, total cost to grape growers</i>
1	0	84,280	0	84,280
2	0	530,180	0	530,180
3	339,606	1,978,620	0	2,318,226
4	1,015,839	5,717,810	0	6,733,649
5	2,368,305	12,158,860	0	14,527,165
6	7,796,043	25,217,850	6,993,946	40,007,839
7	10,509,912	41,474,580	13,987,814	65,972,306
8	13,158,243	59,743,250	23,723,520	96,625,013
9	15,741,036	75,320,840	30,717,466	121,779,342
10	18,192,753	91,014,070	37,711,334	146,918,157
11	19,852,056	104,794,340	43,349,232	167,995,628
12	22,038,642	116,029,060	48,987,110	188,054,812
13	23,951,160	127,965,950	54,624,998	206,542,108
14	25,592,589	137,382,770	60,262,886	223,238,245
15	26,691,840	144,643,100	63,159,014	234,493,954
16	24,505,254	146,790,280	63,159,014	234,454,548
17	24,505,254	146,125,350	63,159,014	233,789,618
18	24,505,254	143,882,620	63,159,014	231,546,888
19	24,505,254	142,084,320	63,159,014	229,748,588

\* Data taken from previous tables.

**Table 19. Summary of losses to grape growers with an average 1% chronic *X. fastidiosa* disease incidence in low risk areas and an average 5% chronic disease incidence in high risk areas\*.**

<i>Year</i>	<i>Cost to replace lost acreage</i>	<i>Value of lost crop</i>	<i>Total pesticide treatment costs</i>	<i>At an average 5% disease incidence in Kern County and the high risk counties, total cost to grape growers</i>
1	0	97,510	0	97,510
2	0	614,460	0	614,460
3	393,228	2,336,320	0	2,729,548
4	1,176,705	6,264,160	0	7,440,865
5	2,725,785	14,483,420	0	17,209,205
6	10,935,909	34,203,470	6,993,946	52,133,325
7	20,006,964	67,499,950	13,987,814	101,494,728
8	28,994,607	112,447,160	23,723,520	165,165,287
9	37,931,607	163,493,400	30,717,466	232,142,473
10	46,642,203	212,235,170	37,711,334	296,606,707
11	57,738,181	262,057,880	43,349,232	363,145,293
12	60,178,779	304,451,700	48,987,110	413,617,589
13	66,309,561	344,315,650	54,624,998	465,250,209
14	72,130,527	378,919,940	60,262,886	511,313,353
15	77,355,693	409,946,740	63,159,014	550,461,447
16	77,561,244	430,976,560	63,159,014	571,696,818
17	77,561,244	445,165,490	63,159,014	585,885,748
18	77,561,244	449,538,250	63,159,014	590,258,508
19	77,561,244	449,927,800	63,159,014	590,648,058

\*Data taken from previous tables.



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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX C**

**HOST LIST OF PIERCE'S DISEASE STRAIN OF  
*XYLELLA FASTIDIOSA*<sup>1</sup>**

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<sup>1</sup> from website maintained by Dr. A. Purcell, University of California, Berkeley

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## Host List of Pierce's Disease Strains of *Xylella fastidiosa*

This is a list of plants in which Pierce's disease (PD) strains of *Xylella fastidiosa* can multiply. Hosts of other strains of *Xylella fastidiosa* (abbreviated as *Xf*) follow the PD list. The lists are alphabetically ordered by the scientific (Latin) name. We used the scientific and common names that appeared in the original references, with limited attempts to reconcile older names with more contemporary ones.

### What does a plant's rating as a "host of *Xylella*" mean?

This list includes plants from which *Xylella* has been recovered using a variety of detection methods. The plants posing the greatest risk in the development of Pierce's disease are those that:

- Develop high populations of *Xylella*
- Allow systemic movement of *Xylella*
- Are preferred feeding hosts of important vector species

### What determined if a particular plant was tested?

Most of the plant species were selected because they are preferred by important insect vectors or because they commonly occur in habitats where those insects live. Not all possible host plants have been tested. The plants that insect vectors feed on most frequently are probably the most important reservoirs of *Xf*. Most of this research has been done in California using plants from areas that have had ongoing problems with Pierce's disease. Some plants were selected arbitrarily or because investigators were curious about plants that belonged to certain botanical families.

### Why are there so many hosts?

PD strains of *Xf* can multiply to some degree within the great majority of plants that are inoculated with the bacterium. However, relatively few plants support moderate to high bacterial populations, and fewer still allow movement of *Xf* beyond the inoculation point. It is easier for an insect vector to pick up *Xylella* from plants that have high bacterial populations. Plants ranked "high" can support between 10 million and 1 billion live bacteria per each gram of tissue. "Low" category plants support less than 100,000 live bacteria per gram of plant. Vector acquisition of *Xf* from plants in the "low" category is very inefficient. The ability of *Xylella* to move systemically throughout the plant, beyond the inoculation (insect feeding) point, is an important host attribute. Systemic movement enables the bacteria to spread on its own to a much larger volume of plant tissue, making it easier for feeding insects to pick it up.

### What factors influence the growth of *Xylella* in a plant?

The growth of *Xylella* in plants depends on the bacterial strain (genetic variation), the plant's physiology and the temperature. Other factors not yet understood may also influence the fate of *Xylella*. The methods used to study *Xf* in plants also determine how well we observe what really happens to the bacteria. Each detection method reveals different kinds of information and has its own level of sensitivity and reliability.

## Key to List Categories

\*\* Plants which were tested and came out negative are indicated by asterisks\*\*.

A blank cell indicates the data was not available.

**FIELD ISOLATED:** *Xylella* was isolated from field-collected material after mechanical (needle) inoculation

**GH ISOLATED:** *Xylella* was isolated from greenhouse-grown material after vector inoculation or needle inoculation. Greenhouse conditions can result in populations of bacteria that are several times higher than for the same plant species in the field.

**POPULATIONS** of *Xf* are expressed as:

**High** = 10 million to one billion live cells per gram of plant material

**Medium** = 100,000 to 9 million live cells per gram of plant material

**Low** = less than 100,000 live cells per gram of plant material

**SYSTEMIC:** "Y" means *Xf* was recovered from tissues beyond the inoculation point. "N" means that the bacteria was not recovered. The bacteria moves from cell to cell in the xylem of the plant. A question mark (?) indicates that *Xf* was detected at a long distance from the inoculation site but this may have been due to the xylem vessels in the plant being very long.

***Xf* DETECTION TECHNIQUE:** The method used to detect *Xylella* from plant material.

**Vector** = Infective insects were caged on plants, removed, and non-infective insects were placed on the same plants for varying intervals of days to weeks. The new insects were then moved to healthy grape or alfalfa test plants. If the test plants became diseased (PD in grapes, alfalfa dwarf in alfalfa), the original plant exposed to infective vectors was presumed to harbor the "virus." These experiments were done by Julius Freitag in the 1940s, when the cause of PD was assumed to be a virus.

**Culture** = Assays based on the growth of *Xf* from finely ground plant samples plated onto semi-selective microbiological media and incubated. The number of live bacteria in the sample can be determined from the number of colonies that grow on the plate. The advantages of culture-based assays are that they quantitatively detect live cells, are fairly sensitive (down to thousands of *Xf* per gram) and highly reliable if the cultured bacteria are further confirmed as *Xf* by other means. Disadvantages are that the method requires at least a week to complete, other bacteria and fungi in plant samples can completely obscure the results, and certain plants (black walnut and coffeeberry, for example) contain substances which inhibit growth of *Xf* on the Petri dish.

**ELISA** = Enzyme-Linked Immuno Sorbent Assay uses antibodies against *Xylella* to detect if *Xf* occurs in the sample. The antibodies bind specifically to proteins on the outer wall of *Xf*, and other reactions allow enzymes to cause a color change in proportion to how many antibodies are bound to *Xf* cells in the sample. The more intense the resultant color, the more bacteria are present. Advantages of ELISA are it can indicate the quantities of *Xf* (dead or alive) in the sample and the test is easily run for many samples. Disadvantages are its low sensitivity (lower detection limit 100,000 *Xf* per sample), failure to distinguish live from dead *Xf* cells, and occasional false positive readings, especially for plants other than grape.

**DIF** = Direct Immuno Fluorescence uses antibodies against *Xylella* to bind a fluorescent indicator dye to *Xf* cells so they can be seen using a microscope that has ultraviolet light illumination.

**PCR** = Polymerase Chain Reaction amplifies a *Xylella*-specific piece of DNA millions of times. The amplified DNA is visible as bands on a gel after separation in an electric field. PCR is becoming more widely used to detect *Xf*. It has the advantage that it is the most sensitive method for detecting *Xf* (to below 100 cells per sample), and can be used even for frozen or preserved samples. PCR also is unlikely to give false positives or be affected by the presence of other microorganisms. PCR can also be used to quickly distinguish some strains of *Xf*. Disadvantages are that it is generally not quantitative, it is still not widely available in diagnostic labs, and cannot distinguish DNA from living vs. dead bacteria. Some naturally-occurring chemicals in plants can inhibit PCR, resulting in negative test results even though *Xf* is present in the plant.

**Budding** = *Xylella* was transmitted when budwood from an infected plant was grafted onto a previously healthy plant. This older method depends on accurate identification of the disease in the indicator (recipient) plants. Successful grafting requires the inclusion of live xylem ("wood") with the scion grafted onto the indicator plant.

**VECTOR HOSTS:** Indicates which important sharpshooter species (for California viticulture) feed or lay eggs on the plant. Blanks indicate no data available or that the plant is not a host.

**BGSS** = Blue-Green Sharpshooter (*Graphocephala atropunctata*). See a list of preferred hosts in coastal California at: [http://www.CNR.Berkeley.EDU/xylella/control\\_guidelines.html](http://www.CNR.Berkeley.EDU/xylella/control_guidelines.html)

**GSS** = Green Sharpshooter (*Draeculacephala minerva*). Primarily found in central California on pasture grasses, and wet locations on sedges and reeds. Highly prefers water grass and Bermuda grass in weedy situations.

**GWSS** = Glassy-Winged Sharpshooter (*Homalodisca coagulata*). See a list of preferred hosts at the California Department of Food and Agriculture's web site on GWSS at <http://plant.cdfa.ca.gov/gwss/>.

**RHSS** = Red-Headed Sharpshooter (*Carneocephala fulgida*). Primarily found in central California on pasture grasses, some sedges and reeds in wet spots. Highly prefers water grass and Bermuda grass in weedy situations.

**REFERENCES:** Reference reporting the results for that host species. See the annotated list of references following the tables.

Plant Host Status for Pierce's Disease Strains of *Xylella fastidiosa*

Scientific Name	Common Name	Field Isolated	GH Isolated	Systemic	Technique	Vector Host	Reference
<i>Acacia longifolia</i>	golden wattle	Y			vector		Freitag '51
<i>Acer macrophyllum</i>	big leaf maple	Y (medium)	Y (medium)	Y?	culture		P + S '99
<i>Acer negundo</i>	box elder		Y (low-med)		culture		P + S '99
<i>Aesculus californica</i>	California buckeye	Y (medium)	Y (low)		culture		P + S '99
<i>Aesculus californica</i>	California buckeye		N		vector		Freitag '51
<i>Aesculus californica*</i>	California buckeye*		N		ELISA		Raju, 1983
<i>Agropyron sp.*</i>	crested wheatgrass*		N		ELISA		Raju, 1983
<i>Alnus rhombifolia</i>	white alder	N	Y (low)	N	culture		P + S '99
<i>Ampelopsis arborea</i>	peppervine	Y			ELISA/cult./DIF		Hopkins '88
<i>Amsinckia douglasiana</i>	buckthorn weed		Y		vector		Freitag '51
<i>Artemisia absinthium*</i>	mugwort*		N		ELISA	BGSS	Raju, 1983
<i>Artemisia douglasiana</i>	mugwort		Y (low-med)		culture	BGSS	P + S '99
<i>Artemisia douglasiana</i>	mugwort	Y	Y		vector	BGSS	Freitag '51
<i>Artemisia douglasiana</i>	mugwort		Y (medium)	N	ELISA/culture	BGSS	H + P '95
<i>Avena fatua</i>	wild oat		Y		vectors		Freitag '51
<i>Avena fatua</i>	wild oat	Y			vectors		Freitag '51
<i>Baccharis pilularis</i>	coyote brush	N	Y (low-med)	N	culture		P + S '99
<i>Baccharis pilularis</i>	coyote brush	Y			vectors		Freitag '51
<i>Baccharis salicifolia</i>	mule fat		Y (medium)	N	culture	BGSS/GWSS	P + S '99
<i>Beta vulgaris*</i>	sugar beet*		N		vectors		Freitag '51
<i>Bidens pilosa</i> var. <i>pilosa</i>	beggar-ticks		N		vectors		Freitag '51
<i>Brassica rapa*</i>	field mustard*		N		vectors		Freitag '51
<i>Bromus catharticus</i>	rescue grass		Y		vectors		Freitag '51
<i>Bromus rigidus</i>	ripgut grass	Y	Y		vectors		Freitag '51
<i>Bromus sp.</i>	Russian brome grass		Y		vectors		Freitag '51
<i>Callicarpa americana</i>	American beautyberry	Y			ELISA/culture		Hopkins '88
<i>Callistephus chinensis</i>	China aster		Y		vectors		Freitag '51
<i>Calycanthus occidentalis*</i>	spicebush*	N			culture		P + S '99
<i>Calycanthus occidentalis*</i>	spicebush*		N		vectors		Freitag '51
<i>Canna sp.</i>	<i>Canna</i>		Y		vectors		Freitag '51
<i>Chenopodium ambrosioides</i>	Mexican tea		N		culture	BGSS	P + S '99
<i>Chenopodium ambrosioides</i>	Mexican tea	Y	Y		vectors	BGSS	Freitag '51
<i>Citrus limon</i>	lemon 'Meyer'		N		vectors	GWSS	Freitag '51
<i>Citrus reticulata</i>	tangerine		N		vectors	GWSS	Freitag '51
<i>Citrus sinensis</i>	sweet orange	Y (low)			culture		Hopkins '91b
<i>Claytonia perfoliata</i>	miner's lettuce		Y		ELISA		Raju, 1983
<i>Conium maculatum</i>	poison hemlock		Y		culture		P + S '99
<i>Coprosma baueri</i>	<i>Coprosma</i>		Y		vectors		Freitag '51
<i>Cotoneaster francheti</i>	<i>Cotoneaster</i>		N		vectors		Freitag '51
<i>Cotoneaster rotundifolia</i>	cotoneaster		Y		vectors		Freitag '51
<i>Cynodon dactylon</i>	Bermuda grass	Y	Y		vectors	RHSS/GSS	Freitag '51
<i>Cynodon dactylon</i>	Bermuda grass*		N		ELISA/culture	RHSS/GSS	H + P '95
<i>Cynodon dactylon*</i>	Bermuda grass*		N		ELISA	RHSS/GSS	Raju, 1983
<i>Cyperus acuminatus*</i>	sedge*		N		culture	RHSS/GSS	P + S '99
<i>Cyperus eragrostis</i>	purple nutsedge		Y		culture	RHSS/GSS	P + S '99
<i>Cyperus esculentus</i>	yellow nutsedge		Y		vectors		Freitag '51
<i>Cytisus scoparius</i>	Scotch broom	Y	Y (med-high)		vectors		Freitag '51
<i>Daucus carota</i> var. <i>sativa</i>	short white carrot		Y		vectors		Freitag '51
<i>Daucus carota*</i>	wild carrot*		N		ELISA		Raju, 1983
<i>Digitaria sanguinalis</i>	hairy crabgrass	Y			vectors		Freitag '51
<i>Digitaria sanguinalis</i>	hairy crabgrass		Y		vectors		Freitag '51

Scientific Name	Common Name	Field Isolated	GH Isolated	Systemic	Technique	Vector Host	Reference
<i>Distichlis spicata*</i>	saltgrass*		N		vectors		Freitag '51
<i>Duranta repens</i>	pigeon-berry	Y			vectors		Freitag '51
<i>Echinochloa crus-galli</i>	water grass		Y (medium)	N	ELISA/culture	RHSS/GSS	H + P '95
<i>Echinochloa crus-galli</i>	water grass	Y	Y		vectors	GSS	Freitag '51
<i>Elymus sp.*</i>	wild rye*		N		ELISA		Raju, 1983
<i>Epilobium californicum</i>	willow-herb		Y		vectors		Freitag '51
<i>Epilobium paniculatum</i>	panicled willow-herb		Y		vectors		Freitag '51
<i>Eragrostis diffusa</i>	diffuse love grass		Y		vectors		Freitag '51
<i>Erodium cicutarium</i>	red stem filaree		Y		vectors		Freitag '51
<i>Escallonia montevidensis</i>	<i>Escallonia</i>	Y			vectors		Freitag '51
<i>Eschscholzia californica*</i>	California poppy*		N		ELISA		Raju, 1983
<i>Eugenia myrtifolia</i>	Aust. brush-cherry	Y	Y		vectors	BGSS	Freitag '51
<i>Fragaria californica</i>	wild strawberry		Y		ELISA		Raju, 1983
<i>Franseria acanthicarpa</i>	annual bur-sage		Y		vectors		Freitag '51
<i>Fraxinus dipetala</i>	California ash	Y			vectors		Freitag '51
<i>Fraxinus latifolia</i>	Oregon ash	N	Y (low)		culture		P + S '99
<i>Fritillaria sp.*</i>	fritillary*		N		ELISA		Raju, 1983
<i>Fuchsia magellanica</i>	<i>Fuchsia</i>	Y			vectors		Freitag '51
<i>Genista monspessulana</i>	French broom	Y	Y (med-high)		culture		P + S '99
<i>Hedera helix</i>	English ivy		Y (low-med)		culture		P + S '99
<i>Hedera helix</i>	English ivy		Y		vectors		Freitag '51
<i>Hedera helix*</i>	English ivy*		N		ELISA		Raju, 1983
<i>Helianthus sp.</i>	wild sunflower		N		vectors	GWSS	Freitag '51
<i>Heteromeles arbutifolia*</i>	toyon*		N		culture		P + S '99
<i>Heteromeles arbutifolia</i>	toyon		Y		vectors		Freitag '51
<i>Hordeum murinum</i>	common foxtail		Y		vectors		Freitag '51
<i>Hordeum nodosum*</i>	wild barley*		N		ELISA		Raju, 1983
<i>Hordeum vulgare</i>	barley		Y		vectors		Freitag '51
<i>Hydrangea paniculata</i>	<i>Hydrangea</i>	Y			vectors		Freitag '51
<i>Juglans californica</i>	Calif. black walnut	N		N	culture		P + S '99
<i>Lactuca serriola</i>	prickly lettuce		Y		vectors		Freitag '51
<i>Lactuca serriola*</i>	prickly lettuce*		N		ELISA		Raju, 1983
<i>Lathyrus cicera</i>	<i>Lathyrus</i>		Y		vectors		Freitag '51
<i>Lathyrus clymenium</i>	<i>Lathyrus</i>		Y		vectors		Freitag '51
<i>Lathyrus sativa</i>	grass pea		Y		vectors		Freitag '51
<i>Lolium multiflorum</i>	Italian ryegrass	Y	Y		vectors	GSS/RHSS	Freitag '51
<i>Lolium temulentum</i>	darnel		Y		vectors		Freitag '51
<i>Lonicera japonica</i>	Japanese honeysuckle		Y		vectors		Freitag '51
<i>Majorana hortensis</i>	sweet majoram	Y			vectors		Freitag '51
<i>Malus sylvestris</i>	apple		N		vectors		Freitag '51
<i>Malva parvifolia</i>	cheeseweed		N		vectors	GWSS	Freitag '51
<i>Matricaria suaveolens</i>	pineapple weed		N		vectors		Freitag '51
<i>Medicago hispida</i>	bur clover	Y			vectors		Freitag '51
<i>Melilotus alba</i>	white melilot		Y		vectors	BGSS	Freitag '51
<i>Melilotus indica</i>	hubam clover		Y		vectors		Freitag '51
<i>Melilotus officinalis</i>	yellow sweet clover		Y		vectors		Freitag '51
<i>Melilotus sp.</i>	sweet clover	Y			vectors		Freitag '51
<i>Melissa officinalis</i>	garden balm	Y			vectors		Freitag '51
<i>Mentha sp.</i>	mint		Y		vectors		Freitag '51
<i>Mimulus aurantiacus</i>	bush monkeyflower		N		vectors		Freitag '51
<i>Nasturtium officinale*</i>	water cress*		N		ELISA		Raju, 1983
<i>Nerium oleander*</i>	oleander*		N		ELISA/culture		Raju, 1983
<i>Nerium oleander*</i>	oleander*		N		culture		Purcell 1999
<i>Oeanthe sarmetosa</i>	water parsley		Y		vectors		Freitag '51

Scientific Name	Common Name	Field Isolated	GH Isolated	Systemic	Technique	Vector Host	Reference
<i>Oenothera hookeri</i>	evening primrose		Y		vectors		Freitag '51
<i>Parthenocissus quinquefolia</i>	Virginia creeper	Y			ELISA/cult./DIF		Hopkins '88
<i>Parthenocissus tricuspidata</i>	Boston ivy	Y	Y		vectors		Freitag '51
<i>Paspalum dilatatum</i>	Dallisgrass	Y	Y		vectors	GSS/RHSS	Freitag '51
<i>Pelargonium hortorum</i>	fish geranium		Y		vectors		Freitag '51
<i>Pennisetum clandestinum</i>	Kikuyugrass		Y		vectors		Freitag '51
<i>Phalaris minor</i>	Mediterranean canary grass		Y		vectors		Freitag '51
<i>Phalaris paradoxa</i>	gnawed canary grass		Y		vectors		Freitag '51
<i>Philadelphus lewisii</i>	syringa		N		vectors		Freitag '51
<i>Phleum pratense</i>	Timothy grass		Y		vectors		Freitag '51
<i>Pitopsisporum crassifolium</i>	karo		Y		vectors		Freitag '51
<i>Plantago lanceolata</i>	English plantain		N		vectors		Freitag '51
<i>Plantago lanceolata*</i>	English plantain*		N		ELISA		Raju, 1983
<i>Platanus occidentalis</i>	sycamore	Y			culture	BGSS	Hopkins '88
<i>Poa annua</i>	annual bluegrass	Y	Y		vectors		Freitag '51
<i>Poa pratensis*</i>	Kentucky bluegrass*		N		vectors		Freitag '51
<i>Polygonum convolvulus</i>	black bindweed		Y		vectors		Freitag '51
<i>Polygonum persicaria</i>	lady's thumb	Y	Y		vectors		Freitag '51
<i>Polygonum ramosissimum*</i>	knot weed*		N		ELISA		Raju, 1983
<i>Polypogon monspeliensis*</i>	rabbit foot grass*		N		vectors		Freitag '51
<i>Populus fremontii</i>	Fremont cottonwood	N	Y (low-med)		culture		P + S '99
<i>Populus sp.*</i>	cottonwood*		N		vectors		Freitag '51
<i>Portulaca oleracea*</i>	common purslane*		N		vectors		Freitag '51
<i>Prunus armeniaca*</i>	apricot*		N		ELISA		Raju, 1983
<i>Prunus demissa</i>	western chokecherry		N		vectors		Freitag '51
<i>Prunus mume</i>	Japanese apricot		N		vectors		Freitag '51
<i>Prunus sp.</i>	wild plum	Y (low-med)			culture		P + S '99
<i>Pseudotsuga menziesii*</i>	Douglas-fir*		N		vectors		Freitag '51
<i>Pyracantha augustifolia</i>	firethorn		N		vectors		Freitag '51
<i>Quercus agrifolia</i>	coast live oak	Y	Y (low-med)	Y?	culture		P + S '99
<i>Quercus domosa*</i>	scrub oak*		N		ELISA		Raju, 1983
<i>Quercus lobata</i>	valley oak	Y (low)	Y (low-med)		culture		P + S '99
<i>Reseda odorata</i>	common mignonette		Y		vectors		Freitag '51
<i>Rhamnus californica*</i>	Calif. coffeeberry*		N		culture		P + S '99
<i>Rheum rhaponticum</i>	rhubarb		Y		vectors		Freitag '51
<i>Rosa californica</i>	California wild rose	Y			culture		P + S '99
<i>Rosa californica</i>	California wild rose	Y			vectors		Freitag '51
<i>Rosa californica*</i>	California wild rose*		N		ELISA		Raju, 1983
<i>Rosmarinus officinalis</i>	rosemary	Y			vectors		Freitag '51
<i>Rubus discolor</i>	Himalayan blackberry		Y (medium)	Y	ELISA/culture	BGSS	H + P '95
<i>Rubus discolor</i>	Himalayan blackberry		Y		ELISA	BGSS	Raju, 1983
<i>Rubus sp.</i>	blackberry	Y			culture	BGSS	Hopkins '88
<i>Rubus ursinus</i>	California blackberry	Y	Y (medium)		culture	BGSS	P + S '99
<i>Rubus ursinus</i>	California blackberry	Y	Y		vectors	BGSS	Freitag '51
<i>Rumex crispus</i>	curly dock	Y	Y		vectors		Freitag '51
<i>Salix bebbiana*</i>	willow*		N		ELISA		Raju, 1983
<i>Salix laevigata</i>	red willow	N	Y (low-med)	N	culture		P + S '99
<i>Salix lasiolepis</i>	arroyo willow	N	Y (low-med)	N	culture		P + S '99
<i>Salix sessilifolia*</i>	sandbar willow*	N		N	culture		P + S '99
<i>Sambucus canadensis</i>	American elder	Y			ELISA/cult./DIF	BGSS?	Hopkins '88
<i>Sambucus mexicana*</i>	blue elderberry*		N		ELISA	BGSS	Raju, 1983
<i>Sambucus mexicana</i>	blue elderberry	Y	Y		vectors	BGSS	Freitag '51
<i>Sambucus mexicana</i>	blue elderberry	Y (medium)	Y (medium)	Y?	culture	BGSS	P + S '99
<i>Setaria lutescens</i>	yellow bristle grass		Y		vectors		Freitag '51

Scientific Name	Common Name	Field Isolated	GH Isolated	Systemic	Technique	Vector Host	Reference
<i>Sonchus asper</i>	prickly sowthistle		Y		vectors		Freitag '51
<i>Sorghum halepense</i>	Johnson grass		Y		vectors		Freitag '51
<i>Sorghum halepense*</i>	Johnson grass*		N		ELISA		Raju, 1983
<i>Sorghum vulgare</i>	Sudangrass		Y		vectors		Freitag '51
<i>Sorghum vulgare*</i>	Sudangrass*		N		ELISA		Raju, 1983
<i>Symphoricarpos albus</i>	snowberry	Y			culture		P + S '99
<i>Symphoricarpos albus</i>	snowberry		Y		vectors	BGSS	Freitag '51
<i>Syringa vulgaris</i>	lilac		Y		vectors		Freitag '51
<i>Tatragonia expansa*</i>	New Zealand spinach*		N		vectors		Freitag '51
<i>Toxicodendron diversilobum*</i>	poison oak*		N		ELISA		Raju, 1983
<i>Toxicodendron diversilobum</i>	poison oak	Y (low-med)	Y		culture		P + S '99
<i>Toxicodendron diversilobum</i>	poison oak	Y			vectors		Freitag '51
<i>Trifolium fragarium</i>	strawberry clover		Y		vectors		Freitag '51
<i>Trifolium hybridum</i>	Aliske clover		Y		vectors		Freitag '51
<i>Trifolium incarnatum</i>	crimson clover		Y		vectors		Freitag '51
<i>Trifolium pratense</i>	red clover		Y		vectors		Freitag '51
<i>Trifolium repens</i>	white clover		Y		vectors	BGSS	Freitag '51
<i>Trifolium repens var. latum</i>	Ladino clover	Y	Y		vectors	BGSS	Freitag '51
<i>Umbellularia californica</i>	California bay or laurel	Y	Y (low)	N	culture		P + S '99
<i>Urtica dioica ssp.gracilis</i>	stinging nettle	Y	Y		vectors	BGSS	Freitag '51
<i>Urtica dioica ssp.gracilis</i>	stinging nettle		Y (low)	N	culture	BGSS	P + S '99
<i>Veronica sp.</i>	speedwell	Y			vectors		Freitag '51
<i>Vicia monathus</i>	vetch		Y		vectors		Freitag '51
<i>Vinca major</i>	greater periwinkle	Y	Y (high)		culture	BGSS	P + S '99
<i>Vinca major</i>	greater periwinkle		Y		vectors	BGSS	Freitag '51
<i>Vinca minor</i>	periwinkle		Y		ELISA	BGSS	Raju, 1983
<i>Vitis californica</i>	Calif. wild grape	Y			vectors	BGSS	Freitag '51
<i>Vitis californica*</i>	Calif. wild grape*		N		ELISA	BGSS	Raju, 1983
<i>Vitis rupestris</i>	St. George	Y			culture	BGSS	P + S '99
<i>Vitis vinifera</i>	grape 'Pinot Noir'		Y (high)	Y	ELISA/culture	BGSS	H + P '95
<i>Vulpia myuros var. hirsuta</i>	foxtail fescue		Y		vectors		Freitag '51
<i>Xanthium strumarium</i>	cocklebur		Y		vectors	BGSS	Freitag '51

### Plant Host Status for Non-PD Strains of *Xylella fastidiosa*

Scientific Name	Common Name	Field.	GH	Systemic?	Technique	SS Pref Host	Reference
<i>Baccharis halimifolia</i>	eastern baccharis	Y			ELISA/DIF		Hopkins '88
<i>Bidens leucantha*</i>	beggarticks*	N			culture		Hopkins '88
<i>Chenopodium ambrosioides*</i>	Mexicantea*	N			culture		Hopkins '88
<i>Citrus sinensis</i>	sweet orange (Florida)	Y			culture	GWSS	Hopkins '91b
<i>Citrus sinensis</i>	sweet orange (California)	N			culture	GWSS	Purcell (unpublished)
<i>Commelina sp.*</i>	<i>Commelina*</i>	N			culture		Hopkins '88
<i>Cotoneaster pyracantha*</i>	<i>Cotoneaster*</i>	N			culture		Hopkins '88
<i>Cynodon dactylon*</i>	Bermuda grass*	N			culture		Hopkins '88
<i>Diospyros sp.*</i>	persimmon*	N			culture		Hopkins '88
<i>Eupatorium capillifolium*</i>	small (dog) fennel*	N			culture		Hopkins '88
<i>Koelreuteria paniculata*</i>	golden raintree*	N			culture		Hopkins '88
<i>Lantana camara*</i>	lantana*	N			culture		Hopkins '88
<i>Ludwigia peruviana*</i>	primrose willow*	N			culture		Hopkins '88

<i>Morus rubra</i> *	mulberry*	N			culture	Hopkins '88
<i>Myrica cyrifera</i> *	southern waxmyrtle*	N			culture	Hopkins '88
<i>Nerium oleander</i>	oleander		Y		ELISA/culture	GWSS Grebus 1996
<i>Nicotiana tabacum</i>	tobacco		Y	Y	PCR	Lopes '00
<i>Panicum sp.*</i>	<i>Panicum</i> *	N			culture	Hopkins '88
<i>Paspalum sp.*</i>	<i>Paspalum</i> *	N			culture	Hopkins '88
<i>Platanus occidentalis</i>	sycamore		Y		ELISA	Hartman '92
<i>Prunus persica</i>	peach	Y			DIF	Hopkins '88
<i>Prunus persica</i>	peach	Y			ELISA	Boyhan '97
<i>Prunus persica</i>	peach		Y	Y	ELISA/culture	Raju, 1982
<i>Prunus salicana</i>	plum	Y			ELISA	Boyhan '97
<i>Prunus salicana</i>	plum		Y	Y	ELISA/culture	Raju, 1982
<i>Prunus serotina</i> *	black cherry*	N			culture	Hopkins '88
<i>Quercus falcata</i>	southern red oak	Y			culture	Hopkins '88
<i>Quercus imbricaria</i>	shingle oak		Y		ELISA	Hartman '92
<i>Quercus laurifolia</i>	laurel oak	Y			culture	Hopkins '88
<i>Quercus nigra</i>	water oak	Y			culture	Hopkins '88
<i>Quercus palustris</i>	pin oak		Y		ELISA	Hartman '91
<i>Quercus rubra</i>	northern red oak		Y		ELISA	Hartman '91
<i>Quercussp.</i>	oak	Y			ELISA	Blake '93.
<i>Rhus sp.</i>	sumac	Y			ELISA	Hopkins '88
<i>Solidago fistulosa</i>	goldenrod	Y			ELISA	Hopkins '88
<i>Ulmus alata</i> *	winged elm*	N			culture	Hopkins '88
<i>Ulmus americana</i>	American elm			Y	budding	Wester '59
<i>Vaccinium pennsylvanicum</i> *	blueberry*	N			culture	Hopkins '88

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX D**

**CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE  
PLANT QUARANTINE MANUAL PAGES DEALING WITH  
PIERCE'S DISEASE AND GLASSY-WINGED SHARPSHOOTER  
RESTRICTIONS**

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## PIERCE'S DISEASE CONTROL PROGRAM

### State Miscellaneous Ruling

#### Article 1. General Provisions.

##### Section 3650. Legislative Intent and Authority.

- (a) The Legislature has declared that the plant killing bacterium, *Xylella fastidiosa*, and the resulting Pierce's disease, and its vectors present a clear and present danger to California's grape industry, as well as to many other commodities and plant life. The Legislature has created the Pierce's Disease Control Program in the Department of Food and Agriculture.
- (b) The Secretary is authorized to establish, maintain, and enforce regulations consistent with the intent of the Legislature as expressed in Sections 6045-6047, Food and Agricultural Code, as may be necessary to interpret, clarify, or implement Sections 6045-6047. This authority shall be liberally construed to effectuate the intent of Sections 6045-6047.
- (c) The regulations in this subchapter are of statewide interest and concern and are intended to wholly occupy the field.

##### Section 3651. Control Program.

- (a) The Pierce's Disease Control Program is to be conducted by the local public entity designated by that county's board of supervisors under a Department approved local Pierce's disease workplan, including proposed treatment of Pierce's disease and its vectors.
- (b) The Department shall provide logistical support for combating Pierce's disease and its vectors.
- (c) **Workplans.**
  - (1) The Pierce's Disease Control Program workplan elements are as specified in Section 6046, Food and Agricultural Code.
  - (2) The Department may permit the local public entity to establish variations from the standards set forth in this subchapter based on the written submission to the Department of clear and convincing evidence of stakes and risks to justify a more stringent standard. Please see County Restrictions on Glassy-winged sharpshooter (page 510) for counties with additional restrictions.
  - (3) The local public entity shall conduct a hearing if an application of the workplan is appealed in writing to that entity. The results of said hearing shall be transmitted to the Department. The hearing notice procedures shall meet minimum due process standards appropriate for the circumstances. The notice and hearing procedures shall be set out in the workplan of the local public entity.

##### Section 3652. Definitions. The following definitions apply to this subchapter:

- (a) "Bulk citrus" means any unprocessed citrus fruit which has not been commercially packed.
- (b) "Bulk grapes" means any unprocessed grapes, which have not been commercially packed.
- (c) "Certification" means the issuance of a certificate in written, stamp, or sticker format by an agricultural commissioner or commissioner representative, which affirms that a shipment meets all applicable regulatory requirements.
- (d) "Infestation" shall mean the detection of five (5) or more adult vectors within any five-day period and within a 300-yard radius, or the detection of multiple life stages.

Vectors detected in direct association with a shipment from an infested area do not, in themselves, constitute an infestation.

If no additional vectors are detected within one complete vector life cycle, or if only adult vectors were detected and thorough vector survey/detection activities document that a breeding population is not present, the infestation designation shall be removed.

- (e) "Infested area" shall mean an area within one (1.0) mile of a vector infestation or an area which has not been surveyed in a manner approved by the Department to detect vectors.
- (f) "Non-infested area" shall mean one in which no infestations have been detected after survey in a manner approved by the Department to detect vectors or where the infestation designation has been removed.
- (g) "Pierce's disease" means the disease of grapevines caused by *Xylella fastidiosa*, a bacterium.
- (h) "Plants" means nursery stock and privately owned plants, which may host vectors of Pierce's disease, except when in the form of seeds, bulbs, stolons, corms, pips, buds, or when otherwise specified by the Department as not presenting a risk for the artificial spread of vectors. [Please refer to Appendix A].
- (i) "Processed grapes" means grapes, which have been juiced, canned, crushed or dried.
- (j) "Vectors or Vectors of Pierce's disease" shall mean *Homalodisca coagulata*, glassy-winged sharpshooter.

##### Section 3653. Area Designation Procedures.

- (a) An area shall be designated as non-infested based on written affirmation to the Department by the local public entity that the area has been surveyed in a manner approved by the Department to detect vectors with negative results.
- (b) An area shall be designated as infested when the survey results indicate an infestation is present, the Department has defined the infested area, and the local public entity is notified immediately. The Department will also provide electronic and/or written notification of the area designations to the other local public entities and other interested or affected parties. [Please refer to Appendix B]
- (c) The local public entity may appeal an area designation by submission to the Department of a written request for review of the designation accompanied by clear and convincing evidence justifying a change in the designation. The appeal must be filed no later than ten (10) working days following receipt of the notice of designation. The Department must respond with a written decision no later than ten (10) working days following receipt of the appeal. During the pending of the appeal, the designation under appeal shall remain in effect.

##### Section 3654. Inspection of Shipments and Disposition of Infested Shipments.

- (a) All shipments of bulk grapes and plants are subject to inspection by the agricultural commissioner upon arrival at destination.
- (b) Any shipment found to be infested with live vectors shall be refused delivery and may be immediately destroyed unless no damage would be caused to agriculture if the shipment is returned to origin or processed or treated in a manner approved by the Department to eliminate the vectors.

**Article 2. Standards for Grapes.** The Secretary hereby establishes the following standards for the movement of bulk grapes to prevent the artificial spread of the Pierce's disease bacterium and its vectors.

**Section 3655. Standards for Movement.** Bulk grapes shall meet the following standards prior to shipment from an infested area to a non-infested area:

- (a) The bulk grapes have originated from a vineyard which has been treated in a manner approved by the Department to eliminate vectors and the grapes are monitored during harvest; or,
- (b) The bulk grapes have originated from a non-infested vineyard as determined by surveys, including trapping and visual, approved by the Department to detect the presence of vectors and the grapes are monitored during harvest; or,
- (c) If the county agricultural commissioner at origin and destination determine that compliance with subparagraph (a) or (b) is not feasible, the bulk grapes and associated plant material may be moved for processing in a manner approved by the Department which eliminates the potential artificial spread of vectors and the grapes are monitored during harvest if feasible, and upon arrival for processing. The commissioners shall notify the Department of their determination as soon as it is practicable; or,
- (d) The bulk grapes have completed a post-harvest treatment approved by the Department to eliminate all live vectors.

**Section 3656. Certification.** Shipments of bulk grapes shall be certified as meeting the standards for movement in the following manner:

- (a) Each shipment of bulk grapes shall be accompanied by a certificate issued by the agricultural commissioner at origin affirming that the shipment meets the standards for movement set forth in Section 3655.
- (b) Prior to the movement of each shipment of bulk grapes moved under section 3655(c), the origin agricultural commissioner shall notify the destination agricultural commissioner of the quantity of grapes being moved, the specific destination, and identification information.

**Section 3657. Exemptions.** These standards do not apply to the following shipments:

- (a) Unprocessed, bulk grapes, which are being transported without undue delay or diversion through non-infested areas to an infested destination for processing or treatment, or are being moved to a destination outside the State.
- (b) Processed grapes.
- (c) Shipments originating from non-infested areas.

**Article 3. Standards for Plants.** The Secretary hereby establishes the following standards for the movements of plants to prevent the artificial spread of the Pierce's disease bacterium and its vectors.

**Section 3658. Standards for Movement.** Plants shall meet the following standards prior to shipment from an infested area to a non-infested area:

- (a) The plants have been treated in a manner approved by the Department to eliminate vectors; or,

- (b) The plants originate from a non-infested portion of a premise as determined by surveys, including trapping and visual, approved by the Department to detect the presence of vectors and the plants are monitored during loading for shipment; or,

- (c) For lots of five plants or less, the plants have been inspected, found to be free of vectors, and have been safeguarded from vectors until shipped.

**Section 3659. Certification.** Shipments of plants shall be certified as meeting the standards for movement in the following manner:

- (a) Each shipment of plants shall be accompanied by a certificate issued by the agricultural commissioner at origin affirming that the shipment meets the standards for movement set forth in Section 3658.

**Section 3660. Exemptions.** These standards do not apply to the following types of shipments:

- (a) Privately owned plants which have been maintained indoors.
- (b) Plants which have been designated by the Department as not presenting a risk for the artificial spread of vectors.
- (c) Plants which are being transported without undue delay or diversion through non-infested areas.
- (d) Plant shipments originating from non-infested areas.

**Article 4. Standards for Citrus Fruit.** The Secretary hereby establishes the following standards for the movement of bulk citrus to prevent the artificial spread of the vectors of Pierce's disease.

**Section 3661. Standards for Movement.** Bulk citrus shall meet the following standards prior to shipment from an infested area to a non-infested area:

- (a) The bulk citrus have been harvested, handled, or treated in a manner approved by the Department to eliminate all live vectors; or,
- (b) The bulk citrus have originated from a non-infested grove as determined by surveys, including trapping and visual, approved by the Department to detect the presence of vectors and the citrus fruit are monitored during harvest.

**Section 3662. Certification.** Shipments of bulk citrus shall be certified as meeting the standards for movement in the following manner:

- (a) Each shipment of bulk citrus shall be accompanied by a certificate or other document issued by the agricultural commissioner at origin affirming that the shipment meets the standards for movement set forth in Section 3661.

**Section 3663. Exemptions.** These standards do not apply to the following types of shipments:

- (a) Processed citrus fruit, including citrus fruit which has been washed and waxed and is being moved in bulk quantities.
- (b) Shipments originating from non-infested areas.

**APPENDIX A**

10-19-01

CDFA Official Host List For Glassy-winged Sharpshooter.

**Notes:**

This list should not be interpreted as a list of plants to remove to protect areas from Pierce's disease.

The Department has determined that cut flowers, cut foliage, or dormant, leafless, bareroot nursery stock of the plant material listed below do not present a risk for the artificial spread of glassy-winged sharpshooter.

The species name has been dropped from all genera. All species in listed genera are considered host plants.

Oviposition hosts are indicated with an asterisk.

Shipments of live plants listed should be considered to present a risk of moving live GWSS, except when in the form of buds, bulbs, corms, cut flowers, cut foliage, pips, seeds, stolons, tubers, or leafless, dormant nursery stock. The host list does not apply to harvested fruits and vegetables. For restrictions on the movement of bulk grapes, please see Section 3655.

The host list will be updated as more information becomes available about the host preferences of GWSS.

**Sorted by Scientific Name:**

**Scientific Name**

**Common Name**

<i>Abelia</i> spp.*	Abelia*
<i>Acacia</i> spp.*	Acacia*
<i>Aeschynanthus</i> spp.*	Basket plant*
<i>Agapanthus</i> spp.*	Agapanthus*
<i>Agonis</i> spp.*	Willow myrtle*
<i>Ajuga</i> spp.*	Bugleweed*
<i>Albizia</i> spp.*	Albizzia*
<i>Aleurites</i> spp.	Aleurites
<i>Ainus</i> spp.*	Alder*
<i>Althaea</i> spp.*	Hollyhock*
<i>Amaranthus</i> spp.*	Amaranth*
<i>Ambrosia</i> spp.	Ragweed
<i>Amelanchier</i> spp.*	Serviceberry*
<i>Ananas</i> spp.*	Ananas*
<i>Annona</i> spp.*	Annona (cherimoya)*
<i>Antirrhinum</i> spp.*	Snapdragon*
<i>Aptenia</i> spp.*	Aptenia*
<i>Arbutus</i> spp.*	Strawberry tree*
<i>Archontophoenix</i> spp.*	Seaforthia*
<i>Arctostaphylos</i> spp.*	Manzanita*
<i>Asclepias</i> spp.*	Milkweed*
<i>Asparagus</i> spp.	Asparagus
<i>Aspidistra</i> spp.*	Aspidistra*
<i>Baccharis</i> spp.*	Baccharis*
<i>Bauhinia</i> spp.*	Bauhinia*

<i>Berberis</i> spp.*	Barberry*
<i>Betula</i> spp.*	Birch*
<i>Bignonia</i> spp.*	Bignonia*
<i>Bougainvillea</i> spp.*	Bougainvillea*
<i>Brachychiton</i> spp.*	Bottle tree*
<i>Brunfelsia</i> spp.*	Brunfelsia*
<i>Buxus</i> spp.*	Boxwood*
<i>Calliandra</i> spp.*	Powderpuff*
<i>Callistemon</i> spp.*	Bottlebrush*
<i>Calodendrum</i> spp.*	Cape chestnut*
<i>Camellia</i> spp.*	Camellia*
<i>Campsis</i> spp.*	Trumpet creeper*
<i>Canna</i> spp.*	Canna*
<i>Carica</i> spp.*	Papaya*
<i>Capsicum</i> spp.*	Pepper, chile*
<i>Cassia</i> spp.*	Senna*
<i>Castanopsis</i> spp.*	Chinquapin*
<i>Catalpa</i> spp.*	Catawba*
<i>Ceanothus</i> spp.*	Redroot*
<i>Ceratonia</i> spp.*	Carob*
<i>Ceratostigma</i> spp.*	Ceratostigma*
<i>Cercis</i> spp.*	Redbud*
<i>Cercocarpus</i> spp.*	Mountain mahogany*
<i>Chenopodium</i> spp.*	Lambsquarter*
<i>Chitalpa</i> spp.*	Chitalpa*
<i>Chlorophytum</i> spp.*	St. Bernard's lily*
<i>Chorisia</i> spp.*	Floss-silk tree*
<i>Chrysanthemum</i> spp.*	Chrysanthemum*
<i>Cinnamomum</i> spp.*	Cinnamomum*
<i>Cissus</i> spp.*	Grape ivy*
<i>Cistus</i> spp.*	Rock rose*
<i>Citrus</i> spp.*	Citrus*
<i>Clytostoma</i> spp.*	Clytostoma*
<i>Coprosma</i> spp.*	Coprosma*
<i>Cordyline</i> spp.*	Ti*
<i>Cornus</i> spp.*	Dogwood
<i>Cotoneaster</i> spp.*	Cotoneaster*
<i>Crassula</i> spp.*	Crassula*
<i>Cupaniopsis</i> spp.*	Cupaniopsis*
<i>Cycas</i> spp.*	Cycad*
<i>Dianthus</i> spp.*	Dianthus*
<i>Dietes</i> spp.*	Dietes*
<i>Diospyros</i> spp.*	Persimmon*

<i>Dodonaea</i> spp.*	<i>Dodonaea</i> *	<i>Lantana</i> spp.*	Shrub verbena*
<i>Elaeagnus</i> spp.	<i>Elaeagnus</i>	<i>Laurus</i> spp. *	Laurel*
<i>Elaeocarpus</i> spp.*	<i>Elaeocarpus</i> *	<i>Ligustrum</i> spp.*	Privet*
<i>Erigeron</i> spp.*	<i>Fleabane</i> *	<i>Limonium</i> spp.*	Statice *
<i>Eriobotrya</i> spp.*	<i>Eriobotrya</i> *	<i>Liquidambar</i> spp.*	Sweet gum*
<i>Erythrina</i> spp.*	<i>Coral tree</i> *	<i>Liriodendron</i> spp.*	Tulip tree*
<i>Escallonia</i> spp.*	<i>Escallonia</i> *	<i>Litchi</i> spp.*	Lychee*
<i>Eucalyptus</i> spp.*	<i>Eucalyptus</i> *	<i>Lonicera</i> *	Honeysuckle*
<i>Eugenia</i> spp.*	<i>Eugenia</i> *	<i>Macadamia</i> spp.*	Macadamia*
<i>Euonymus</i> spp.*	<i>Euonymus</i> *	<i>Mandevilla</i> spp.*	Mandevilla*
<i>Eupatorium</i> spp.	<i>Boneset</i>	<i>Magnolia</i> spp.*	Magnolia*
<i>Euryops</i> spp.*	<i>Euryops</i> *	<i>Malus</i> spp.	Apple
<i>Fatsyhedera</i> spp.*	<i>Aralia ivy</i> *	<i>Malva</i> spp.	Mallow
<i>Feijoa</i> spp.*	<i>Feijoa</i> *	<i>Mangifera</i> spp.*	Mango*
<i>Ficus</i> spp.*	<i>Fig</i> *	<i>Maytenus</i> spp.*	Maytenus*
<i>Fortunella</i> spp.*	<i>Kumquat</i> *	<i>Melaleuca</i> spp.*	Honey myrtle*
<i>Fraxinus</i> spp.*	<i>Ash</i> *	<i>Melia</i> spp.	Chinaberry
<i>Gardenia</i> spp.*	<i>Gardenia</i> *	<i>Metrosideros</i> spp.*	<i>Metrosideros</i> *
<i>Gazania</i> spp.*	<i>Gazania</i> *	<i>Michelia</i> spp.*	Champak*
<i>Geijera</i> spp.*	<i>Geijera</i> *	<i>Mirabilis</i> spp.*	Umbrella wort*
<i>Gelsemium</i> spp. *	<i>Yellow jessamine</i> *	<i>Monarda</i> spp.	Wild bergamot
<i>Ginkgo</i> spp.*	<i>Ginkgo</i> *	<i>Morus</i> spp.*	Mulberry*
<i>Gladiolus</i> spp.	<i>Gladiolus</i>	<i>Murraya</i> spp.*	Orange jessamine*
<i>Gossypium</i> spp.	<i>Cotton</i>	<i>Myoporum</i> spp.*	<i>Myoporum</i> *
<i>Grewia</i> spp*	<i>Grewia</i> spp*	<i>Myrtus</i> spp.*	Myrtle*
<i>Hardenbergia</i> spp.*	<i>Hardenbergia</i> *	<i>Nandina</i> spp.*	<i>Nandina</i> *
<i>Harpephyllum</i> spp.*	<i>Kaffir plum</i> *	<i>Nephrolepis</i> spp.*	Sword fern*
<i>Hedera</i> spp.*	<i>Ivy</i> *	<i>Nerium</i> spp.*	Oleander*
<i>Helianthus</i> spp.*	<i>Sunflower</i> *	<i>Nicotiana</i> spp.*	Tree tobacco*
<i>Hemerocallis</i> spp.*	<i>Daylily</i> *	<i>Nyssa</i> spp.	Tupelo
<i>Heteromeles</i> spp. *	<i>Toyon</i> *	<i>Oenothera</i> spp.	Evening primrose
<i>Hibiscus</i> spp.*	<i>Hibiscus</i> *	<i>Olea</i> spp.*	Olive*
<i>Howea</i> spp.*	<i>Sentry palm</i> *	<i>Opuntia</i> spp.*	Cactus*
<i>Hymenosporum</i> spp.*	<i>Hymenosporum</i> *	<i>Osmanthus</i> spp.*	<i>Osmanthus</i> *
<i>Hypericum</i> spp.*	<i>St. John's-wort</i> *	<i>Osteospermum</i> spp.*	<i>Osteospermum</i> *
<i>Ilex</i> spp.*	<i>Holly</i> *	<i>Pachysandra</i> spp.*	Spurge*
<i>Itea</i> spp.*	<i>Itea</i> *	<i>Pandorea</i> spp.*	<i>Pandorea</i> *
<i>Jacaranda</i> spp.*	<i>Green ebony</i> *	<i>Parthenocissus</i> spp.*	Woodbine*
<i>Jasminum</i> spp.*	<i>Jasmine</i> *	<i>Pelargonium</i> spp.*	Ivy geranium*
<i>Juglans</i> spp.	<i>Walnut</i>	<i>Persea</i> spp.*	Avocado*
<i>Koelreuteria</i> spp.*	<i>Golden-rain tree</i> *	<i>Philadelphus</i> spp.*	Mock orange*
<i>Lactuca</i> spp.	<i>Lettuce</i>	<i>Philodendron</i> spp.*	<i>Philodendron</i> *
<i>Lagerstroemia</i> spp.*	<i>Crape myrtle</i> *	<i>Phlox</i> spp.*	<i>Phlox</i> *

<i>Phoenix</i> spp.*	Date palm*	<i>Tecomaria</i> spp.	Tecomaria
<i>Phormium</i> spp.*	Flax lily*	<i>Thuja</i> spp.	Arborvitae
<i>Photinia</i> spp.*	Photinia*	<i>Tipuana</i> spp.*	Tipu Tree*
<i>Phytolacca</i> spp.	Pokeweed	<i>Trachelospermum</i> spp.*	Trachelospermum*
<i>Pinus</i> spp.	Pine	<i>Tradescantia</i> spp.*	Spiderwort*
<i>Pistacia</i> spp.*	Pistachio*	<i>Tristania</i> spp.*	Tristania*
<i>Pittosporum</i> spp.*	Pittosporum*	<i>Tulbaghia</i> spp.*	Tulbaghia*
<i>Platanus</i> spp.*	Sycamore*	<i>Tupidanthus</i> spp.*	Tupidanthus*
<i>Platycerium</i> spp.*	Staghorn fern*	<i>Ulmus</i> spp.*	Elm*
<i>Plumbago</i> spp.*	Leadwort*	<i>Vauquelinia</i> spp.*	Arizona rosewood*
<i>Podocarpus</i> spp.*	Podocarpus*	<i>Veronica</i> spp.*	Speedwell*
<i>Polygala</i> spp.*	Milkwort*	<i>Viburnum</i> spp.*	Viburnum*
<i>Polygonum</i> spp.*	Polygonum*	<i>Vigna</i> spp.	Vigna
<i>Populus</i> spp.*	Cottonwood*	<i>Vinca</i> spp.*	Periwinkle*
<i>Protea</i> spp.*	Protea*	<i>Viola</i> spp.*	Violet*
<i>Prunus</i> spp.*	Prunus*	<i>Vitis</i> spp.*	Grape*
<i>Psidium</i> spp.*	Guava*	<i>Washingtonia</i> spp.*	Washington palm*
<i>Punica</i> spp.*	Pomegranate*	<i>Wisteria</i> spp.*	Wisteria*
<i>Pyracantha</i> *	Pyracantha/Firethorn*	<i>Xanthium</i> spp.	Cocklebur
<i>Pyrus</i> spp.*	Pear*	<i>Xylosma</i> spp.*	Xylosma*
<i>Quercus</i> spp.*	Oak*	<i>Yucca</i> spp.	Yucca
<i>Raphiolepis</i> spp.*	Raphiolepis*	<i>Zantedeschia</i> spp.*	Calla lily*
<i>Rhamnus</i> spp.*	Buckthorn*	<i>Zea</i> spp.	Zea
<i>Rhododendron</i> spp.*	Azalea*		
<i>Rhus</i> spp.*	Sumac*		
<i>Robinia</i> spp.*	Locust*		
<i>Rosa</i> spp.*	Rose*		
<i>Rubus</i> spp.	Blackberry		
<i>Rudbeckia</i> spp.	Coneflower		
<i>Salix</i> spp.*	Willow*		
<i>Sambucus</i> spp.*	Elderberry*		
<i>Sapium</i> spp.*	Sapium*		
<i>Sassafras</i> spp.	Sassafras		
<i>Schefflera</i> spp.*	Umbrella tree*		
<i>Schinus</i> spp.*	Schinus*		
<i>Simmondsia</i> spp.*	Jojoba*		
<i>Solanum</i> spp.*	Solanum*		
<i>Solidago</i> spp.	Goldenrod		
<i>Sonchus</i> spp.	Sonchus		
<i>Sorghum</i> spp.*	Sorghum*		
<i>Strelitzia</i> spp.*	Bird of paradise*		
<i>Syringa</i> spp.*	Lilac*		
<i>Tabebuia</i> spp.*	Trumpet tree*		

**Sorted by Common Name:**

Common Name	Scientific Name
Abelia*	<i>Abelia</i> spp.*
Acacia*	<i>Acacia</i> spp.*
Agapanthus*	<i>Agapanthus</i> spp.*
Albizzia*	<i>Albizia</i> spp.*
Alder*	<i>Ainus</i> spp.*
Aleurites	<i>Aleurites</i> spp.
Amaranth*	<i>Amaranthus</i> spp.*
Ananas*	<i>Ananas</i> spp.*
Annona (cherimoya)*	<i>Annona</i> spp.*
Apple	<i>Malus</i> spp.
Aptenia*	<i>Aptenia</i> spp.*
Aralia ivy*	<i>Fatsyhedera</i> spp.*
Arborvitae	<i>Thuja</i> spp.
Arizona rosewood*	<i>Vauquelinia</i> spp.*
Ash*	<i>Fraxinus</i> spp.*
Asparagus	<i>Asparagus</i> spp.
Aspidistra*	<i>Aspidistra</i> spp.*

Avocado*	<i>Persea</i> spp.*	Crassula*	<i>Crassula</i> spp.*
Azalea*	<i>Rhododendron</i> spp.*	Cupaniopsis*	<i>Cupaniopsis</i> spp.*
Baccharis*	<i>Baccharis</i> spp.*	Cycad*	<i>Cycas</i> spp.*
Barberry*	<i>Berberis</i> spp.*	Date palm*	<i>Phoenix</i> spp.*
Basket plant*	<i>Aeschynanthus</i> spp.*	Daylily*	<i>Hemerocallis</i> spp.*
Bauhinia*	<i>Bauhinia</i>	Dianthus*	<i>Dianthus</i> spp.*
Bead tree	<i>Melia</i> spp.	Dietes*	<i>Dietes</i> spp.*
Bignonia*	<i>Bignonia</i> spp.*	Dodonaea*	<i>Dodonaea</i> spp.*
Birch*	<i>Betula</i> spp.*	Elaeagnus	<i>Elaeagnus</i> spp.
Bird of paradise*	<i>Strelitzia</i> spp.*	Elaeocarpus*	<i>Elaeocarpus</i> spp.*
Blackberry	<i>Rubus</i> spp.	Elderberry*	<i>Sambucus</i> spp.*
Boneset	<i>Eupatorium</i> spp.	Elm*	<i>Ulmus</i> spp.*
Bottle tree*	<i>Brachychiton</i> spp.*	Eriobotrya*	<i>Eriobotrya</i> spp.*
Bottlebrush*	<i>Callistemon</i> spp.*	Escallonia*	<i>Escallonia</i> spp.*
Bougainvillea*	<i>Bougainvillea</i> spp.*	Eucalyptus*	<i>Eucalyptus</i> spp.*
Boxwood*	<i>Buxus</i> spp.*	Eugenia*	<i>Eugenia</i> spp.*
Brunfelsia*	<i>Brunfelsia</i> spp.*	Euonymus*	<i>Euonymus</i> spp.*
Buckthorn*	<i>Rhamnus</i> spp.*	Euryops*	<i>Euryops</i> spp.*
Bugleweed*	<i>Ajuga</i> spp.*	Evening primrose	<i>Oenothera</i> spp.
Cactus*	<i>Opuntia</i> spp.*	Feijoa*	<i>Feijoa</i> spp.*
Calla lily*	<i>Zantedeschia</i> spp.*	Fig*	<i>Ficus</i> spp.*
Camellia*	<i>Camellia</i> spp.*	Fire thorn*	<i>Pyracantha</i> spp.*
Canna*	<i>Canna</i> spp.*	Flax lily*	<i>Phormium</i> spp.*
Cape Chestnut*	<i>Calodendrum</i> spp.*	Fleabane*	<i>Erigeron</i> spp.*
Carob*	<i>Ceratonia</i> spp.*	Floss-silk tree*	<i>Chorisia</i> spp.*
Catawba*	<i>Catalpa</i> spp.*	Gardenia*	<i>Gardenia</i> spp.*
Ceratostigma*	<i>Ceratostigma</i> spp.*	Gazania*	<i>Gazania</i> spp.*
Champak*	<i>Michelia</i> spp.*	Geijera*	<i>Geijera</i> spp.*
Cheeseweed	<i>Malva</i> spp.	Gingko*	<i>Gingko</i> spp.*
Chinquapin*	<i>Castanopsis</i> spp.*	Gladiolus	<i>Gladiolus</i> spp.
Chitalpa*	<i>Chitalpa</i> spp.*	Golden-rain tree*	<i>Koelreuteria</i> spp.*
Chrysanthemum*	<i>Chrysanthemum</i> spp.*	Goldenrod	<i>Solidago</i> spp.
Cinnamomum*	<i>Cinnamomum</i> spp.*	Grape ivy*	<i>Cissus</i> spp.*
Citrus*	<i>Citrus</i> spp.*	Grape*	<i>Vitis</i> spp.*
Clytostoma*	<i>Bignonia</i> spp.*	Green ebony*	<i>Jacaranda</i> *
Cocklebur	<i>Xanthium</i> spp.	Grewia*	<i>Grewia</i> spp.*
Coneflower	<i>Rudbeckia</i> spp.	Guava*	<i>Psidium</i> spp.*
Coprosma*	<i>Coprosma</i> spp.*	Hardenbergia*	<i>Hardenbergia</i> spp.*
Coral Tree*	<i>Erythrina</i> spp.*	Hibiscus*	<i>Hibiscus</i> spp.*
Cotoneaster*	<i>Cotoneaster</i> spp.*	Holly*	<i>Ilex</i> spp.*
Cotton	<i>Gossypium</i> spp.	Hollyhock*	<i>Althaea</i> spp.*
Cottonwood*	<i>Populus</i> spp.*	Honey myrtle*	<i>Melaleuca</i> spp.*
Crape myrtle*	<i>Lagerstroemia</i> spp.*	Honeysuckle*	<i>Lonicera</i> spp.*

Hymenosporum*	<i>Hymenosporum</i> spp.*	Philodendron*	<i>Philodendron</i> spp.*
Itea*	<i>Itea</i> spp.*	Phlox*	<i>Phlox</i> spp.*
Ivy*	<i>Hedera</i> spp.*	Photinia*	<i>Photinia</i> spp.*
Ivy geranium*	<i>Pelargonium</i> spp.*	Pine	<i>Pinus</i> spp.
Jasmine*	<i>Jasminum</i> spp.*	Pistachio*	<i>Pistacia</i> spp.*
Joboba*	<i>Simmondsia</i> spp.*	Pittosporum*	<i>Pittosporum</i> spp.*
Kaffir plum*	<i>Harphephyllum</i> spp.*	Podocarpus*	<i>Podocarpus</i> spp.*
Kumquat*	<i>Fortunella</i> spp.*	Pokeweed	<i>Phytolacca</i> spp.
Lambsquarter*	<i>Chenopodium</i> spp.*	Polygonum*	<i>Polygonum</i> spp.*
Laurel*	<i>Laurus</i> spp.*	Pomegranate*	<i>Punica</i> spp.*
Leadwort*	<i>Plumbago</i> spp.*	Powderpuff*	<i>Calliandra</i> spp.*
Lettuce*	<i>Lactuca</i> spp.*	Privet*	<i>Ligustrum</i> spp.*
Lilac*	<i>Syringa</i> spp.*	Protea*	<i>Protea</i> spp.*
Locust*	<i>Robinia</i> spp.*	Prunus*	<i>Prunus</i> spp.*
Lychee*	<i>Litchi</i> spp.*	Ragweed	<i>Ambrosia</i> spp.
Macadamia*	<i>Macadamia</i> spp.*	Raphiolepis*	<i>Raphiolepis</i> spp.*
Magnolia*	<i>Magnolia</i> spp.*	Redbud*	<i>Cercis</i> spp.*
Mallow	<i>Malva</i> spp.	Redroot*	<i>Ceanothus</i> spp.*
Mandevilla*	<i>Mandevilla</i> spp.*	Rock rose*	<i>Cistus</i> spp.*
Mango*	<i>Mangifera</i> spp.*	Rose*	<i>Rosa</i> spp.*
Manzanita*	<i>Arctostaphylos</i> spp.*	St. Bernard's lily*	<i>Chlorophytum</i> spp.*
Maytenus*	<i>Maytenus</i> spp.*	St. John's-wort*	<i>Hypericum</i> spp.*
Metrosideros*	<i>Metrosideros</i> spp.*	Sapium*	<i>Sapium</i> spp.*
Milkweed*	<i>Asclepias</i> spp.*	Sassafras	<i>Sassafras</i> spp.
Milkwort*	<i>Polygala</i> spp.*	Schinus*	<i>Schinus</i> spp.*
Mock orange*	<i>Philadelphus</i> spp.*	Seafortia*	<i>Archontophoenix</i> spp.*
Mountain mahogany*	<i>Cercocarpus</i> spp.*	Senna*	<i>Cassia</i> spp.*
Mulberry*	<i>Morus</i> spp.*	Sentry palm*	<i>Howea</i> spp.*
Myoporum*	<i>Myoporum</i> spp.*	Serviceberry*	<i>Amelanchier</i> spp.*
Myrtle*	<i>Myrtus</i> spp.*	Shrub verberna*	<i>Lantana</i> spp.*
Nandina*	<i>Nandina</i> spp.*	Snapdragon*	<i>Antirrhinum</i> spp.*
Oak*	<i>Quercus</i> spp.*	Solanum*	<i>Solanum</i> spp.*
Oleander*	<i>Nerium</i> spp.*	Sonchus	<i>Sonchus</i> spp.
Olive*	<i>Olea</i> spp.*	Sorghum*	<i>Sorghum</i> spp.*
Orange jessamine*	<i>Murraya</i> spp.*	Speedwell*	<i>Veronica</i> spp.*
Osmanthus*	<i>Osmanthus</i> spp.*	Spiderwort*	<i>Tradescantia</i> spp.*
Osteospermum*	<i>Osteospermum</i> spp.*	Spurge*	<i>Pachysandra</i> spp.*
Pandorea*	<i>Pandorea</i> spp.*	Staghorn fern*	<i>Platycerium</i> spp.*
Papaya*	<i>Carica</i> spp.*	Statice*	<i>Limonium</i> spp.*
Pear*	<i>Pyrus</i> spp.*	Strawberry tree*	<i>Arbutus</i> spp.*
Pepper, chile*	<i>Capsicum</i> spp.*	Sumac*	<i>Rhus</i> spp.*
Periwinkle*	<i>Vinca</i> spp.*	Sunflower*	<i>Helianthus</i> spp.*
Persimmon*	<i>Diospyros</i> spp.*	Sweetgum*	<i>Liquidambar</i> spp.*

Sword fern*	<i>Nephrolepis</i> spp.*	Umbrella tree*	<i>Schefflera</i> spp.*
Sycamore*	<i>Platanus</i> spp.*	Viburnum*	<i>Viburnum</i> spp.*
Tecomaria	<i>Tecomaria</i> spp.	Vigna	<i>Vigna</i> spp.
Ti*	<i>Cordyline</i> spp.*	Violet*	<i>Viola</i> spp.*
Tipu Tree*	<i>Tipuana</i> spp.*	Walnut	<i>Juglans</i> spp.
Toyon*	<i>Heteromeles</i> spp.*	Washington palm*	<i>Washingtonia</i> spp.*
Trachelospermum*	<i>Trachelospermum</i> spp.*	Wild bergamot	<i>Monarda</i> spp.
Tree tobacco*	<i>Nicotiana</i> spp.*	Willow myrtle*	<i>Agonis</i> spp.*
Tristania*	<i>Tristania</i> spp.*	Willow*	<i>Salix</i> spp.*
Trumpet creeper*	<i>Campsis</i> spp.*	Wisteria*	<i>Wisteria</i> spp.*
Trumpet tree*	<i>Tabebuia</i> spp.*	Woodbine	<i>Parthenocissus</i> spp.
Tulbaghia*	<i>Tulbaghia</i> spp.*	Xylosma*	<i>Xylosma</i> spp.*
Tulip tree*	<i>Liriodendron</i> spp.*	Yellow jessamine*	<i>Gelsemium</i> spp.*
Tupelo	<i>Nyssa</i> spp.	Yucca	<i>Yucca</i> spp.
Tupidanthus*	<i>Tupidanthus</i> spp.*	Zea	<i>Zea</i> spp.
Umbrella wort*	<i>Mirabilis</i> spp.*		

## APPENDIX B

### GWSS Infested Areas

The GWSS infested areas are the entire counties of Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura, and portions of (see details below for bolded counties): Butte, Contra Costa, Fresno, Imperial, Kern, Sacramento, Santa Barbara, Santa Clara, and Tulare counties. Intrastate shipments found infested with this pest can be rejected under California Food and Agricultural Code Section 6521.

[Please note: Nursery stock from the infested states of Alabama, Arkansas, Florida, Louisiana, Mississippi, Nevada, North Carolina, South Carolina, and Texas already enters California under a Quarantine Warning Hold Notice (008). GWSS is also known to occur in Mexico. Interstate shipments found infested with this pest can be rejected under California Food and Agricultural Code Section 6461.5.]

- **Butte** That portion of Butte County in the Chico area bounded by a line drawn as follows: Beginning at the intersection of State Highway 32 (Deer Creek Highway) and East Ninth Street; then, easterly along State Highway 32 to its intersection with Forest Avenue; then, southerly along said avenue to its intersection with Humboldt Road; then, easterly along said road to its intersection with Bruce Road; then, southerly along Bruce Road to its intersection with Little Chico Creek; then, easterly along said creek to its intersection with Little Chico-Butte Creek Diversion Canal; then, southerly along said canal to its intersection with Butte Creek; then, westerly from said creek along an imaginary line to the intersection of State Highway 99 and Southgate Avenue; then, southwesterly from the intersection of State Highway 99 and Southgate Avenue along an imaginary line to the intersection of K.V. Lane and The Midway; then, northwesterly from the intersection of K.V. Lane and The Midway along an imaginary line to the intersection of Skyway Avenue and Hegan Lane; then, northeasterly along Hegan Lane to its intersection with The Midway; then, northwesterly along The Midway to its intersection with Park Avenue; then, northwesterly along said avenue to its intersection with East Ninth Street; then, northeasterly along said street to the point of beginning.
- **Contra Costa** That portion of Contra Costa County in the Brentwood area bounded by a line drawn as follows: Beginning at the intersection of Brentwood Boulevard and Sycamore Avenue; then, easterly along said avenue to its intersection with Sellers Avenue; then, southeasterly from said intersection along an imaginary line to the intersection of Chestnut Street and Eden Plains Road; then, due south from the intersection of Chestnut Street and Eden Plains Road along an imaginary line to its intersection with Main Canal; then, westerly along said canal to its intersection with Sellers Avenue; then, southerly along said avenue to its intersection with Church Road; then, southwesterly from said intersection along an imaginary line to the east end of Eureka Avenue; then, westerly along said avenue to its intersection with Walnut Boulevard; then, northerly along said boulevard to its intersection with Contiente Avenue; then, westerly along said avenue to its intersection with Persimmon Drive; then, northerly from said intersection along an imaginary line to the intersection of McClarren Road and Pippo Avenue; then, northerly along said avenue to its intersection with Dainty Avenue; then, northeasterly from said intersection along an imaginary line to the intersection of Spruce Street and Brentwood Boulevard; then, northerly along said boulevard to the point of beginning.
- **Fresno** That portion of Fresno County in the Fresno area bounded by a line drawn as follows: Beginning at the intersection of Peach Avenue and Kings Canyon Road; then, easterly along said road to its intersection with Fowler Avenue; then, southerly

along said avenue to its intersection with Jensen Avenue; then, westerly along Jensen Avenue to its intersection with Peach Avenue; then, northerly along Peach Avenue to the point of beginning.

That portion of Fresno County in the Fresno area bounded by a line drawn as follows: Beginning at the intersection of North Cedar Avenue and East Clinton Avenue; then, westerly along East Clinton Avenue to its intersection with North Palm Avenue; then, northerly along North Palm Avenue to its end; then, due north from the north end of Palm Avenue along an imaginary line to its intersection with the San Joaquin River; then, northeasterly along said river to the point where an imaginary line drawn due north from the intersection of North Cedar Avenue and Herndon Avenue intersects said river; then, south from said point along said line to the intersection of North Cedar Avenue and Herndon Avenue; then southerly along North Cedar Avenue to the point of beginning.

That portion of Fresno County in the Clovis area bounded by a line drawn as follows: Beginning at the intersection of Maple Avenue and Shepherd Avenue; then, easterly along Shepherd Avenue to its intersection with Fowler Avenue; then, southerly along Fowler Avenue to its intersection with Ashlan Avenue; then, westerly from said intersection along an imaginary line to the intersection of Peach Avenue and Ashlan Avenue; then, westerly along Ashlan Avenue to its intersection with Cedar Avenue; then, northerly along Cedar Avenue to its intersection with Herndon Avenue; then, easterly along Herndon Avenue to its intersection with Maple Avenue; then, northerly along Maple Avenue to the point of beginning.

That portion of Fresno County in the Fowler area bounded by a line drawn as follows: Beginning at the intersection of Adams Avenue and Temperance Avenue; then, southerly on Temperance Avenue to its intersection with Walter Avenue; then, easterly along Walter Avenue to its intersection with Logan Avenue; then, due south from said intersection along an imaginary line to its intersection with Manning Avenue; then, westerly along Manning Avenue to its intersection with Fowler Avenue; then, northerly along Fowler Avenue to its intersection with Parlier Avenue; then, westerly along Parlier Avenue to its intersection with Sunnyside Avenue; then, due north from said intersection along imaginary line to its intersection with East Sumner Avenue; then, easterly along East Sumner Avenue to its intersection with West Tuolumne Street; then, northeasterly along said street to its end; then, northeasterly from the end of West Tuolumne Street along an imaginary line to the west end of East Tuolumne Street; then, northeasterly along East Tuolumne Street to its intersection with Adams Avenue; then, easterly along Adams Avenue to the point of beginning.

That portion of Fresno County in the Kingsburg area bounded by a line drawn as follows: Beginning at the intersection of Golden State Boulevard and Stroud Avenue; then, easterly along said avenue to its intersection with Eighteenth Avenue; then, southerly along Eighteenth Avenue to its intersection with the Fresno County Line; then, westerly along said line to its intersection with Indianola; then, northerly along Indianola to its intersection with Elkhorn Avenue; then, easterly along Elkhorn Avenue to its intersection with Indianola; then, northerly along Indianola to its intersection Kamm Avenue; then, easterly along Kamm Avenue to its intersection with Golden State Boulevard; then southerly along said boulevard to the point of beginning.

- **Imperial** That portion of Imperial County in the Desert Shores and Salton Sea Beach area bounded by a line drawn as follows: Beginning at the intersection of State Highway 86 and Coolidge Springs Road; then, due east along an imaginary line to its intersection with the Salton Sea; then southerly along the shore of the Salton Sea to its intersection with Tonalee Ditch; then southwestly along said ditch to an imaginary line drawn southward from the end of Coolidge Springs Road; then northerly along said imaginary line and road to the point of beginning.
- **Kern** That portion of Kern County in the Bakersfield, Edison, Lamont, Arvin, and Mettler areas bounded by a line drawn as follows: Beginning at the intersection of State Highway 65 and James Road; then, southerly along said highway to its intersection with 7th (Seventh) Standard Road; then, westerly along said road to its intersection with Allen Road; then, southerly along Allen Road to its intersection with Stockdale Highway; then, easterly along said highway to its intersection with Buena Vista Road; then, southerly along said road to its intersection with Panama Lane; then, easterly on said lane to its intersection with State Highway 99; then, southerly along said highway to State Highway 166; then, westerly on State Highway 166 to its intersection with Old River Road; then, northerly along said road to its intersection with Copus Road; then, westerly along Copus Road to its intersection with Basic School Road; then, southerly along Basic School Road to its end; then, due south from the end of said road along an imaginary line to its intersection with the Kern County Line; then, easterly and northerly along said county line to its intersection with Searles Station Road; then, westerly from said intersection along an imaginary line to the point of beginning.
- **Sacramento** That portion of Sacramento County in the Rancho Cordova area bounded by a line drawn as follows: Beginning at the intersection of Sunrise Boulevard and South Bridge Street; then, easterly along said street to its intersection with Perdeta Lane; then, southeasterly from said intersection along an imaginary line to the intersection of Country Rock and Mother Lode Circle; then, southerly along Country Rock to its intersection with Mother Lode Circle; then, northeasterly along said circle to its intersection with Tailrace Drive; then, southerly along said drive to its intersection with Gold Country Boulevard; then, easterly along said boulevard to its intersection with Prospect Hill Drive; then, due south from said intersection along an imaginary line to White Rock Road; then, westerly along said road to its intersection with Luyung Drive; then, southwestly from said intersection along an imaginary line to the east end of Sanders Drive; then, westerly along said drive to its intersection with Sunrise Boulevard; then, westerly from said intersection along an imaginary line to the intersection of Prospect Park Drive and Disc Drive; then, northerly along Prospect Park Drive to its intersection with White Rock Road; then, westerly along said road to its intersection with Prospect Park Drive; then, northerly along Prospect Park Drive to its intersection with Gold Center Drive; then, westerly along Gold Center Drive to its intersection with Zinfandel Drive; then, northerly along Zinfandel Drive to its intersection with Olson Drive; then, westerly along Olson Drive to its intersection with Gwendolyn Way; then, northwestly from said intersection along an imaginary line to the intersection of Malaga Way and

Aramon Drive; then, northeasterly along said drive to its intersection with Chassella Way; then, northwesterly along said way to its intersection with Dolecetto Drive; then, northerly along said drive to its intersection with Chardonay Drive; then, northwesterly along Chardonay Drive to its intersection with Coloma Road; then, northeasterly along said road to its intersection with Georgetown Drive; then, westerly along said drive to its intersection with Riveredge Way; then, westerly along said way to its intersection with Ambassador Drive; then, due northwest from said intersection along an imaginary line to the American River; then, northeasterly along said river to the point where an imaginary line drawn due south from the intersection of Clinton Way and Alexander Court intersects said river; then, easterly from said point to the point of beginning.

- **Santa Barbara** That portion of Santa Barbara County lying south of a line drawn as follows: Beginning at the Point Arguello lighthouse; then easterly along an imaginary line to the summit of El Tranquillon Mountain; then southeasterly along an imaginary line to the point of intersection of Jalama Creek and Escondido Creek; then easterly along an imaginary line to the point of intersection of Gaviota Creek and the summit of the Santa Ynez Range; then easterly along the summit of the Santa Ynez Range to the east Santa Barbara County boundary line.
- **Santa Clara** General vicinity of South San Jose (Actual boundaries currently being determined. Contact the Santa Clara County Agricultural Commissioner's Office or the CDFA Pierce's Disease Control Program for information).
- **Tulare** That portion of Tulare County in the Porterville area bounded by a line drawn as follows: Beginning at the intersection of Avenue 184 and Road 248; then, northerly along said road to its intersection with Avenue 192; then, westerly along Avenue 192 its end; then, westerly from the west end of said avenue along an imaginary line to the east end of Avenue 192; then, westerly along Avenue 192 to a point 1/4-mile west of Road 220; then, due south from said point along an imaginary line to its intersection with Poplar Avenue; then, easterly along said avenue to its intersection with Road 284; then, northerly from said intersection along an imaginary line to the intersection of Road 276 and Avenue 176; then, northwesterly from said intersection along an imaginary line to the point of beginning.

That portion of **Tulare** County in the Magnolia area bounded by a line drawn as follows: Beginning at the intersection of Road 268 and Avenue 120; then, westerly along said avenue to its intersection with Road 248; then, northerly along said road to its intersection with Teapot Dome Avenue; then, northerly from said intersection along an imaginary line to the intersection of South Main Street and Gibbons Avenue; then, easterly along said avenue to its intersection with Plano Street; then, southeasterly from said intersection along an imaginary line to the intersection of Avenue 136 and Road 264; then, southeasterly from the intersection of Avenue 136 and Road 264 along an imaginary line to the intersection of Teapot Dome Avenue and Road 268; then, southerly along said road to the point of beginning.

That portion of **Tulare** County in the Terra Bella area bounded by a line drawn as follows: Beginning at the intersection of Avenue 106 and Road 248; then, southerly along said road to its intersection with Avenue 88; then, westerly along Avenue 88 to its intersection with Road 224; then, northerly along said road to its intersection with Deer Creek; then, northeasterly from said intersection along an imaginary line to the west end of Avenue 106; then, easterly along said avenue to the point of beginning.

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX E**

**COMPILATION OF  
PEST PREVENTION MANDATES FROM THE  
CALIFORNIA FOOD AND AGRICULTURAL CODE**

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## **PIERCE'S DISEASE CONTROL AND PEST PREVENTION IN CALIFORNIA**

The Legislature created the Pierce's Disease Control Program in the California Department of Food and Agriculture ("CDFA"). In addition to its specific responsibilities regarding the control and combating of Pierce's disease and vectors of the disease, the CDFA has the responsibility for agricultural plant pest and disease prevention. Pursuant to the Food and Agricultural Code ("FAC"), pests include a wide array of diseases and animal and plant life which are, or are liable to be, dangerous or detrimental to the state's agricultural industry. To accomplish CDFA's responsibility, the Secretary of the CDFA is authorized to conduct pest exclusion, pest detection, pest eradication, pest management, and pest control activities. The five central elements of the proposed Pierce's Disease Control Program, public outreach, statewide survey and detection, contain the spread, local management/rapid response, and research are consistent with the CDFA's implementation of the FAC's various pest prevention mandates and authorizations.

Pest exclusion consists of quarantine activities which are carried out at various points of entry, including highways, airports and marine ports of entry, and various terminal points, such as nurseries, truck, rail and bus terminals, wholesale markets, post offices, and parcel services. The United States Department of Agriculture performs foreign pest exclusion activities at all foreign ports of arrival.

Pest detection relies on a wide array of insect traps placed throughout the state. Trapping activities are complemented by special visual surveys and campaigns to enlist the support of the public in reporting new or unusual pest findings.

While the FAC requires the Secretary to eradicate newly-discovered pests whenever feasible, it leaves to his discretion the selection of the methods employed to achieve eradication. As a matter of policy, the Secretary will select from the available array of treatment methods those that are the most effective and least environmentally damaging at each site.

The Secretary may also adopt regulations to carry out the responsibilities to prevent and control any pests and has specific authority to adopt regulations for combating Pierce's disease and its vectors.

In addition to the Secretary, county agricultural commissioners have responsibility to carry out the pest prevention mandates codified in the FAC. Local public agencies were specifically mandated to establish work plans to combat Pierce's disease and the glassy-winged sharpshooter.

A summary of the significant pest prevention mandates contained in the FAC is included in this appendix and followed by copies of the relevant code sections.

## SUMMARY OF SIGNIFICANT PEST PREVENTION MANDATES

The Legislature has determined that the provisions of the FAC are enacted in the power of this state for the purposes of promoting and protecting the agricultural industry of the state and for the protection of the public health, safety, and welfare. In all civil actions, the provisions of the FAC shall be liberally construed for the accomplishment of these purposes. (FAC Sections 3 and 401)

“Secretary” and “Director” mean the Secretary of Food and Agriculture. (Sections 35 and 50)

The Department shall prevent the introduction and spread of injurious insects or plant diseases. (Section 403)

The Department shall execute the provisions of the FAC. (Section 404)

The Secretary may adopt such regulations as are reasonably necessary to carry out the provisions of this Code which he is directed or authorized to enforce. (Section 407)

The Secretary may enter upon any premises to inspect the premises or any plant, appliance, or thing which is on such premises. (Section 408)

The Department may conduct surveys or investigations for the purpose of detecting the presence of, or determining the status of, a pest or disease. (Section 461)

The Legislature has found and declared that the economic strength of California’s agricultural industry depends on farmers’ and ranchers’ ability to profitably market the commodities and products raised. In furtherance of the promotion and protection the agricultural industry of the state and for the protection of public health, safety and welfare, the Legislature shall encourage productive and profitable agriculture. (Sections 802 & 821).

“Pest” means any infectious, transmissible, or contagious disease; or any disorder which is characteristic of any infectious, transmissible, or contagious disease; or any form of animal life; and any form of vegetable life which is, or is liable to be, dangerous or detrimental to the agricultural industry of this state. (Section 5006)

Eradication or control of newly discovered pests is mandated by the Legislature. (Sections 5251-5254)

The Secretary is authorized to promulgate regulations establishing eradication areas and quarantines for the purpose of eradicating newly discovered pests. (Sections 5322 and 5761)

Any premises, plants, conveyances or things which are infected or infested with any pest, or premises where any pest is found, are a public nuisance. (Section 5401) It is unlawful for any person to maintain such a public nuisance. (Section 5402).

Infested or infected premises, plants, conveyances and other things constituting public nuisances are subject to abatement and all other remedies given by law for the prevention and abatement of public nuisances. (Sections 5401 through 5405).

After service of notice, the county agricultural commissioner may determine that such a public nuisance constitutes an immediate hazard to adjoining or nearby property, and that great or irreparable injury would result from delay until expiration of the time required by law for constructive notice; he or she may forthwith abate the nuisance by eradicating, controlling, or destroying the pest. (Section 5404)

The Secretary may enter into cooperative agreements for the purpose of eradicating, controlling, or destroying any infectious disease or pest within this state; and the Secretary may enter into cooperative agreements with boards of supervisors or county agricultural commissioners for the purpose of administering and enforcing this code or any activity, duty, or responsibility under this code in addition to those activities, duties, or responsibilities specifically designated or authorized to be carried out by the commissioners. (Section 482)

Unless a specific provision of the FAC otherwise provides, where the FAC places joint responsibility for the enforcement of laws and regulations on the Secretary and the county agricultural commissioner, the commissioner shall be responsible for local administration of the enforcement program. The Secretary shall be responsible for overall statewide enforcement and shall issue instructions and make recommendations to the commissioner. Such instructions and recommendations shall govern the procedure to be followed by the commissioner in the discharge of his duties. The Secretary shall furnish assistance in planning and otherwise developing an adequate county enforcement program, including uniformity, coordination, training, special services, special equipment, and forms, statewide publicity, statewide planning, and emergency assistance. (Section 2281)

The Legislature has found and declared that the plant-killing bacterium, *Xyella Fastidiosa*, and the resulting pathogen, Pierce's disease, and its vectors present a clear and present danger to California's fifty billion dollar grape industry, as well as to many other commodities and plant life. (Section 6045)

The Legislature created the Pierce's Disease Control Program in the Department of Food and Agriculture. (Section 6045)

The Legislature created the Pierce's Disease Management Account in the Food and Agriculture Fund. Funds appropriated by the Legislature shall be available for expenditure by the department, state and local entities for the purpose of combating Pierce's disease or its vectors; including research and other efforts. (Section 6046)

Funds appropriated for local assistance shall be allocated to the local public entity after the local public entity creates a Pierce's disease work plan that has been approved by the department. Any funds allocated by the department to a designated local public entity shall be utilized for activities consistent with the local Pierce's disease work plan or other programs or work plans

approved by the department. It shall be the responsibility of the designated local public entity to develop and implement the local Pierce's disease work plan. Upon request, the department shall provide consultation to the local public entity regarding its work plan. (Section 6046)

The Secretary may establish, maintain, and enforce regulations to interpret, clarify, or implement this article, and this authority shall be liberally construed to effectuate the combating and control Pierce's disease and its vectors. (Section 6047)

**CALIFORNIA FOOD AND AGRICULTURAL CODE**  
**SECTIONS DEALING WITH PESTS AND PEST ERADICATION**

<u>Section</u>	<u>Text</u>
35	"Secretary" means the Secretary of Food and Agriculture.
50	Whenever the term "director," "secretary," "Director of Agriculture," or "Secretary of Agriculture" appears in any law, it means the "Secretary of Food and Agriculture."
401.5	The department shall also seek to enhance, protect, and perpetuate the ability of the private sector to produce food and fiber in a way that benefits the general welfare and economy of the state. The department shall also seek to maintain the economic well-being of agriculturally dependent rural communities in this state.
403	The department shall prevent the introduction and spread of injurious insect or animal pests, plant diseases, and noxious weeds.
404	The department shall execute the provisions of this code, except as otherwise provided, and of other laws administered by it.
405	(a) With the prior approval of the Department of Fish and Game and the State Department of Health Services, the department may reproduce or distribute biological control organisms that are not detrimental to the public health and safety which are known to be useful in reducing or preventing plant or animal damage due to pests or diseases.
407	The director may adopt such regulations as are reasonably necessary to carry out the provisions of this code which he is directed or authorized to administer or enforce.
408	The director may enter upon any premises to inspect the premises or any plant, appliance, or thing which is on such premises.
461	The department may conduct surveys or investigations of any nursery, orchard, vineyard, agricultural commodity, agricultural appliance, farm, or other premises within the state liable to be infested or infected with any pest as defined in Section 5006 or disease, including any infectious, transmissible, and contagious diseases of

livestock and poultry, for the purpose of detecting the presence of, or determining the status of, the pest or disease. The director and the county agricultural commissioner shall consult concerning these surveys or investigations and in the conduct or implementation of any control or eradication activity when the provisions of this code provide joint responsibilities in connection with the pest or disease.

- 482
- (a) The director may enter into cooperative agreements with individuals, associations, boards of supervisors, and with departments, divisions, bureaus, boards, or commissions of this state or of the United States for the purpose of eradicating, controlling, or destroying any infectious disease or pest within this state.
  - (b) The director may enter into cooperative agreements with boards of supervisors or commissioners for the purpose of administering and enforcing this code.
  - (c) The director may enter into cooperative agreements with boards of supervisors and commissioners for the purpose of administering and enforcing any activity, duty, or responsibility under this code in addition to those activities, duties, or responsibilities specifically designated or authorized to be carried out by the commissioners. The cooperative agreement shall provide for payment to the county or commissioner for the county's or the commissioner's performance under the agreement except where payment is provided for elsewhere in this code. Where this code requires the director to perform an activity, duty, or responsibility, an agreement entered into under this subdivision does not relieve the director of ultimate responsibility for that performance.
- 802
- The Legislature finds and declares the following:
- (a) Agriculture is the number one industry in California, which is the leading agricultural state in the country.
  - (b) Although California's cultivated land accounts for approximately 3 percent of the country's entire supply of farmland, the state has historically produced about 10 percent of the farm cash receipts in the United States.
  - (c) California leads the nation in the production of approximately 50 different crops and livestock products.
  - (d) The diversity of the state's agriculture is truly impressive, for over 250 different commodities are grown here.
  - (e) Family owned farms produce most of the food and fiber produced by the California agricultural industry.
  - (f) The economic strength of the California's agricultural industry depends on farmers and ranchers being able to profitably market the commodities and products raised.
  - (g) A profitable and healthy farming industry must be sustained by a sound natural resource base of soils, water, and air which is developed, conserved, and maintained to ensure sufficient quantities and the highest optimum quality possible.

- 821 As part of promoting and protecting the agricultural industry of the state and for the protection of public health, safety, and welfare, the Legislature shall provide for a continuing sound and healthy agriculture in California and shall encourage a productive and profitable agriculture. Major principles of the state's agricultural policy shall be all of the following:
- (a) To increase the sale of crops and livestock products produced by farmers, ranchers, and processors of food and fiber in this state.
  - (b) To enhance the potential for domestic and international marketing of California agricultural products through fostering the creation of value additions to commodities and the development of new consumer products.
  - (c) To sustain the long-term productivity of the state's farms by conserving and protecting the soil, water, and air, which are agriculture's basic resources.
  - (d) To maximize the ability of farmers, ranchers, and processors to learn about and adopt practices that will best enable them to achieve the policies stated in this section.
- 2001 There is in each county government the county department of agriculture.
- 2002 The county department of agriculture is under the control of the county agricultural commissioner.
- 2121 The commissioner shall be appointed by the board of supervisors of the county. Any chartered county may, however, prescribe a different method of appointment.
- 2125 In any county in which no commissioner has served, the director shall perform the duties of commissioner in the same manner, to the same extent, and with the same authority as if he had been the duly appointed commissioner in such county.
- 2126 The commissioner may appoint deputy commissioners, inspectors, and clerks who shall serve at his pleasure. Such inspectors may be designated as county agricultural inspectors or county agricultural biologists.
- 2271 The commissioner shall keep a record of his official acts.
- 2272 (a) The commissioner shall make an annual report to the director on the condition of agriculture in his or her county and on what is being done to eradicate, control, or manage pests, and actions relating to the exclusion of pests or quarantine against pests. The commissioner may include in the annual report information relating to organic farming methods, biotechnology, integrated pest management, and biological control activities in the county. The commissioner shall also furnish from time to time to the director any other information the director may require.
- (b) This section shall become operative July 1, 1999.
- 2273 The commissioner shall also make a monthly report to the board of supervisors if and when so required by the board.

2280 The director, when acting in person with a commissioner, has all the rights of such commissioner.

2281 Except as otherwise specifically provided, in all cases where provisions of this code place joint responsibility for the enforcement of laws and regulations on the director and the commissioner, the commissioner shall be responsible for local administration of the enforcement program. The director shall be responsible for overall statewide enforcement and shall issue instructions and make recommendations to the commissioner. Such instructions and recommendations shall govern the procedure to be followed by the commissioner in the discharge of his duties. The director shall furnish assistance in planning and otherwise developing an adequate county enforcement program, including uniformity, coordination, training, special services, special equipment, and forms, statewide publicity, statewide planning, and emergency assistance.

The instructions and recommendations shall include a cost analysis of the local administration of such programs, determined from data supplied by the commissioner pursuant to Section 2272. Such cost analysis shall identify the joint programs or activities for which funds necessary to maintain adequate county administration and enforcement have not been provided. The director shall develop, jointly with the commissioners, county priorities for such enforcement programs and activities.

The director shall report annually to the Legislature his findings concerning the cost analysis with specific regard to programs where funds are inadequate for an efficient enforcement program, together with a listing of the priorities jointly established by the director and the commissioners that are contained in the formal instructions and recommendations of the director.

2282 (a) Except as provided in Section 2282.5, and to the extent funds are appropriated in the annual Budget Act, the Secretary of Food and Agriculture or the Director of Pesticide Regulation may allocate annually to each county an amount determined by the secretary or the director not to exceed one-third of the amount expended by the county during the previous fiscal year for the programs of joint responsibility under the jurisdiction of the secretary or director, as applicable. The allocations shall be made from funds appropriated to the secretary or the director for purposes of carrying out activities of joint responsibility with the commissioners at the local levels.

(b) The annual report to the Legislature required by Section 2281 shall include findings for each of the following joint programs, including the amounts allocated to, and expended by, the counties in the previous fiscal year and the proposed amount to be allocated by the secretary for each program for the ensuing budget year:

- (1) Pest detection.
- (2) Pest eradication.
- (3) Pest management control.
- (4) Pest exclusion.
- (5) Seed inspection.

- (6) Nursery inspection.
- (7) Fruit and vegetable quality control.
- (8) Egg quality control.
- (9) Apiary inspection.
- (10) Crop statistics.

The report shall also specify the programs that have been augmented with state funds each year since 1980 because of new legislative mandates, or because of pest infestations or outbreaks occurring since that date, and the annual amounts of those augmentations.

- 2283 The commissioner, in carrying out his responsibilities under Section 2281, may assist the department in the conduct of surveys or investigations pursuant to Section 461 for the purpose of preventing the introduction and spread of injurious insect or animal pests, plant diseases, and noxious weeds under Section 403.
- 2284 The commissioner may, with the approval of the board of supervisors, contract with any person or association to certify the condition of a shipment of a product regulated under this code. The condition certified to may include the temperature of the product. The contract shall provide for payment to the commissioner for the commissioner's total cost in performing the certification.
- 5006 "Pest" means any of the following things that is, or is liable to be, dangerous or detrimental to the agricultural industry of the state:
  - (a) Any infectious, transmissible, or contagious disease of any plant, or any disorder of any plant which manifests symptoms or behavior which the director, after investigation and hearing, finds and determines is characteristic of an infectious, transmissible, or contagious disease.
  - (b) Any form of animal life.
  - (c) Any form of vegetable life.
- 5007 "Plant" includes any part of a plant, tree, plant product, shrub, vine, fruit, vegetable, seed, bulb, stolon, tuber, corm, pip, cutting, scion, bud, graft, or fruit pit.
- 5008 "Shipment" means any article or thing which is, may be, or has been transported from one place to another place.
- 5023 The commissioner, whenever necessary, may enter and make an inspection of any premises, plant, conveyance, or thing in his jurisdiction.
- 5101 Each commissioner is an enforcing officer of all laws and regulations which relate to the prevention of the introduction into, or the spread within, the state of pests. He is, as to such activities, under the supervision of the director.
- 5251 Upon the discovery of any pest, the director shall immediately report the discovery to the commissioner of the county in which the pest is found.

- 5252 The director shall furnish to the commissioner a statement as to the best known means or methods for eradicating or controlling the discovered pest and advise him of the procedure or treatment to prevent the further spread of the pest.
- 5253 The commissioner shall disseminate all or any portion of the statement in whatever manner he may deem is best suited to inform persons that own or have charge or possession of any premises or appliances within the county where there is a probability of the presence of the pest.
- 5254 In any county where there is no commissioner, or if the director finds that the commissioner has failed or neglected to use all reasonable means to effect the control or eradication of any discovered pest, the director may undertake the control or eradication of the pest. He may exercise any power or authority which is conferred on the commissioner by this division.
- 5321 If the director receives information of the existence of any pest which is not generally distributed within this state, he shall thoroughly investigate the existence and probability of its spread, and the feasibility of its control or eradication.
- 5322 The director may establish, maintain, and enforce quarantine, eradication, and such other regulations as are in his or her opinion necessary to circumscribe and exterminate or prevent the spread of any pest which is described in Section 5321.
- 5323 This division and the regulations which are established pursuant to this division are of a statewide interest and concern and are intended to occupy the field. No local jurisdiction shall adopt ordinances, laws, or regulations which prevent, hinder, or delay the effect or application of this division or regulations established pursuant to this division. Regulations established pursuant to this division are not valid unless they are clearly consistent with a strict interpretation of this division and are necessary to effectuate the purpose of this division. The adoption of the regulations does not create any presumption of their necessity or validity.
- 5401 Any premises, plants, conveyances or things which are infected or infested with any pest, or premises where any pest is found, are a public nuisance, and shall be prosecuted as such in all actions and proceedings. All remedies which are given by law for the prevention and abatement of a nuisance apply to such a public nuisance.
- 5402 It is unlawful for any person to maintain such a public nuisance. The remedies which are provided by this article are in addition to any other remedy by way of abatement which is provided in this division.
- 5403 If, after service of notice pursuant to this chapter a public nuisance is not abated within the time which is specified in the notice, the commissioner shall abate the nuisance by eradicating, controlling, or destroying the pest.

- 5404 (a) If, after service of the notice pursuant to this chapter, the commissioner determines that the nuisance constitutes an immediate hazard to adjoining or nearby property, and that great or irreparable injury would result from delay until expiration of the time required by law for constructive notice, he or she may forthwith abate the nuisance by eradicating, controlling, or destroying the pest.
- (b) For purposes of this section, cotton, which is being produced in violation of a host-free period declared pursuant to Article 5 (commencing with Section 5781) of Chapter 8 of this part, is a nuisance.
- (c) The commissioner shall take summary abatement action against any cotton found in violation of a planting date established as part of a host-free period. The person producing the cotton shall be given not more than 48 hours to commence abatement of the nuisance and shall be given not more than five days to complete abatement.
- (d) If the person producing the cotton fails to commence and complete abatement within the time specified by the commissioner pursuant to subdivision (c), the commissioner shall abate the nuisance by disking to a depth of six inches. The person who produced the cotton shall pay 150% of all costs associated with the commissioner's abatement of the nuisance.
- (e) The commissioner may request that the district attorney assist him or her in expediting summary abatements pursuant to this section.
- 5405 The board of supervisors of any county may authorize the commissioner to contract with any state or federal agency, public corporation for municipal purposes, or person that owns, controls, or administers within the county any property or premises which are infected or infested with any pest, to eradicate, destroy, or control it on such property or premises. The contract shall not impose any cost or obligation on the county, unless the imposition of the cost or obligation upon the county is authorized by the board of supervisors.
- 5421 If the commissioner finds, after inspection, that any premises, plant, conveyance, or thing in his jurisdiction is infected or infested with any pest, he may in writing notify the record owner or person in charge or possession of the premises, plant, conveyance, or thing, that it is infected or infested with a pest.
- He may, to his satisfaction, require the person to eradicate, destroy, or control, the pest within the time which is specified in the notice.
- 5551 Any neglected or abandoned plant or crop is a public nuisance in any of the following circumstances:
- (a) It is a menace to the agriculture of the county, district, or vicinity because of the existence of any pest, in or on it.
- (b) It is a menace to the agriculture of the county, district, or vicinity because of the existence of any other condition than the condition described in subdivision (a).
- (c) It is a host plant of, or provides a favorable or likely harbor for, any pest.

- 5552 Any cotton plant which is uncultivated or that is left from a previous season is presumed to harbor pests and as such is a public nuisance. This presumption is a presumption affecting the burden of producing evidence. If any such cotton plant is not destroyed in the manner established by regulation of the director, by March 1st of any year or by such earlier date as shall be proclaimed by the director as the beginning of a host-free period pursuant to Section 5781 of this code, it is subject anytime thereafter to all remedies which are or may be given for the prevention or abatement of nuisances.
- 5553 It is unlawful for any person to maintain any neglected or abandoned plant or crop which is a public nuisance.
- 5554 All remedies for the prevention or abatement of nuisances apply to any such nuisance.
- 5555 If, after service of the notice pursuant to Article 1.5 (commencing with Section 5561) the nuisance is not abated within the time prescribed in the notice or such time as may be mutually agreed upon by the commissioner and the record owner or person having charge or possession of the property, the commissioner shall proceed under the provisions of Article 2 (commencing with Section 5571).
- 5701 (a) If any pest exists on any premises, the director or the commissioner may hold any plant or other host or possible carrier which is, or may be, capable of disseminating or carrying the pest. The director or the commissioner also may hold the plants, other hosts, or other possible carriers on any premises within five miles of the premises on which the pest was found to exist. The director or commissioner shall notify the owner of the plant or other host or possible carrier, or his or her agent, of this action, and the issuance of any shipping permit or nursery stock certificate with respect to the plant or other host or possible carrier shall be refused and any such permit or certificate which has been previously issued shall be revoked.  
(b) The distance from the premises at which a pest is found that the director or commissioner may hold plants, other hosts, or other possible carriers shall be the maximum distance that the director or commissioner determines the pest is likely to travel, but not to exceed five miles.
- 5702 If, in the opinion of the director or commissioner, the plant or other host or possible carrier is not infested or infected with the pest, or has been disinfected or cleaned so as to eradicate or control the pest, the director or commissioner shall in writing release it or issue the shipping permit or nursery stock certificate as the case may be.
- 5703 This article does not affect any other authority which is granted to a commissioner by Chapter 3 (commencing with Section 6501), Part 2 of this division.
- 5704 It is unlawful for any person to move any plant or other host or possible carrier from the premises on which a hold notice has been issued, except under the written

permission of the director or commissioner and in accordance with the conditions which are stated in the written permission.

- 5705 (a) The director or commissioner may enter into compliance agreements with any person which provide for the movement of hosts or other possible carriers of any pest from one area of the state to another. These agreements shall establish the treatment, harvesting, packing, and handling requirements that may be necessary to assure that the hosts or carriers are not infested.
- (b) Violation of the treatment, harvesting, packing, or handling terms of a compliance agreement is unlawful.
- (c) Any person who violates treatment, harvesting, packing, or handling terms in an agreement is also liable civilly in an amount not exceeding ten thousand dollars (\$10,000). This remedy is in addition to, and does not supersede or limit, any and all other remedies, civil or criminal, that otherwise are available to the state.
- (d) Any funds recovered by the department pursuant to this section shall be deposited in the Department of Food and Agriculture Fund for use, upon appropriation by the Legislature, to cover costs related to the enforcement of this division.
- 6045 (a) The Legislature hereby finds and declares that the plant killing bacterium, *Xyella Fastidiosa* and the resulting pathogen, Pierce's disease, and its vectors present a clear and present danger to California's fifty billion dollar grape industry, as well as to many other commodities and plant life.
- (b) There exists an ongoing need for at least fifteen million dollars (\$15,000,000) annually in research and programs to combat Pierce's disease and its vectors in California.
- 6046 (a) There is hereby created in the Department of Food and Agriculture the Pierce's Disease Control Program.
- (b) The Governor shall appoint a statewide coordinator, and the secretary shall provide an appropriate level of support staffing and logistical support for combating Pierce's disease and its vectors.
- (c) (1) There is hereby created the Pierce's Disease Management Account in the Food and Agriculture Fund.
- (2) The account shall consist of money transferred from the General Fund under subdivision (d) and money made available from federal, industry, and other sources. Money made available from federal, industry, and other sources shall be available for expenditure without regard to fiscal year for the purpose of combating Pierce's disease or its vectors. State general funds to be utilized for research shall only be expended when the secretary has received commitments from non-state sources for at least a 25-percent match for each state dollar to be expended.
- (d) (1) The sum of six million nine hundred thousand dollars (\$6,900,000) is hereby appropriated from the General Fund to the account created by this article in the Department of Food and Agriculture Fund and shall be available for expenditure by the department without regard to fiscal year for the purpose of combating Pierce's disease or its vectors.

(2) It is the intent of the Legislature that a total of thirteen million eight hundred thousand dollars (\$13,800,000) be made available from the General Fund for purposes of providing funding to the program established by subdivision (a). Therefore, it is further the intent of the Legislature, in addition to the appropriation in paragraph (1), to appropriate six million nine hundred thousand dollars (\$6,900,000) from the General Fund in the Budget Act of 2000 to the department for the purpose of funding the program established by subdivision (a).

(e) The funds appropriated pursuant to this section to the Food and Agriculture Fund for the purpose of combating Pierce's disease and its vectors shall be used for costs that are incurred by the state or by local entities during and subsequent to the fiscal year of the act that added this section for the purpose of research and other efforts to combat Pierce's disease and its vectors.

(f) Whenever, in any county, funds are allocated by the Department of Food and Agriculture for local assistance regarding Pierce's disease and its vectors, those funds shall be made available to a local public entity, or local public entities, designated by that county's board of supervisors.

(g) Funds appropriated for local assistance shall not be allocated to the local public entity until the local public entity creates a Pierce's disease work plan that is approved by the department. Any funds allocated by the department to a designated local public entity or designated local public entity shall be utilized for activities consistent with the local Pierce's disease work plan or other programs or work plans approved by the department. It shall be the responsibility of the designated local public entity to develop and implement the local Pierce's disease work plan. Upon request, the department shall provide consultation to the local public entity regarding its work plan.

(h) The work plan created by the designated local public entity shall include, but is not limited to, all of the following:

(1) In coordination with the department, the development and delivery of producer outreach information and training to local communities, groups, and individuals to organize their involvement with the work plan and to raise awareness regarding Pierce's disease and its vectors.

(2) In coordination with the department, the development and delivery of ongoing training of the designated local public entity's employees in the biology, survey, and treatment of Pierce's disease and its vectors.

(3) The identification within the designated local public entity of a local Pierce's disease coordinator.

(4) The proposed treatment of Pierce's disease and its vectors. Treatment programs shall comply with all applicable laws and regulations and shall be conducted in an environmentally responsible manner.

(5) In coordination with the department, the development and implementation of a data collection system to track and report new infestations of Pierce's disease and its vectors in a manner respectful of property and other rights of those affected.

(6) On an annual basis, while funds appropriated by this section are available for encumbrance, the department shall review the progress of each local public entity's activities regarding Pierce's disease and its vectors and, as needed, make recommendations regarding those activities to the local public entity.

(i) Notwithstanding Section 7550.5 of the Government Code, the department shall report to the Legislature on January 1, 2001, and each January 1 while this section is operative, regarding its expenditures, progress, and ongoing priorities in combating Pierce's disease and its vectors in California.

(j) This article shall become inoperative on January 1, 2006, and as of January 1, 2007, is repealed, unless a later enacted statute that is enacted before January 1, 2007, deletes or extends the dates on which it becomes inoperative and is repealed.

6047 The secretary may establish, maintain, and enforce regulations consistent with the intent of the Legislature as expressed in this article as may be necessary to interpret, clarify, or implement this article. This authority shall be liberally construed to effectuate the intent of this article.

## **STATUTES DEALING WITH PIERCE'S DISEASE RELATED RESEARCH**

### Assembly Bill 1232

AB 1232 appropriates \$750,000 each year for fiscal years 1999-2000, 2000-01, and 2001-02, from the General Fund to the Secretary of Food and Agriculture for the purpose of funding, on a competitive basis, Pierce's disease research. The bill also specifies that the appropriation for each year shall become operative only upon an annual commitment during that year for at least \$250,000 in private contributions from the California viticulture and enology industry. This bill requires the Secretary to appoint an advisory task force consisting of scientific experts, including, but not limited to, university researchers and agricultural representatives, for the purpose of advising the Secretary on research to control and eradicate Pierce's disease.

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX F**

**GLASSY-WINGED SHARPSHOOTER  
ENVIRONMENTAL PROTECTION TASK FORCE  
RECOMMENDATIONS, DECEMBER 1, 2000**

**EXCERPTS FROM FINAL REPORT:**

**COVER**

**EXECUTIVE SUMMARY**

**FRAMEWORK OF REPORT**

**INTRODUCTION**

**TASK FORCE PANEL**

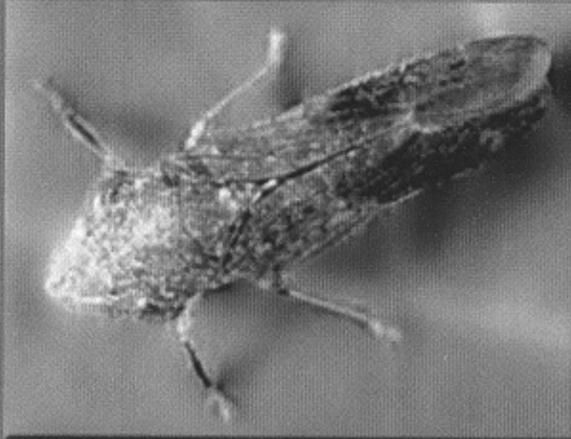
**FINAL RECOMMENDATIONS**

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# **GWSS**

**Glassy-Winged Sharpshooter**



## **Environmental Protection Task Force Recommendations December 1, 2000**

**Submitted to Secretary William (Bill) J. Lyons, Jr.  
California Department of Food and Agriculture**

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The Glassy-Winged Sharpshooter Environmental Protection Task Force, composed of state agency representatives, environmental and public health and non-governmental organizations and advocacy groups, grower organizations, a university researcher and a county agricultural commissioner, convened in the Fall of 2000 to suggest measures to the California Department of Food and Agriculture (CDFA) that would reduce possible harm to public health and the environment in its implementation of a statewide program to eradicate and prevent glassy-winged sharpshooter and Pierce's disease. The glassy-winged sharpshooter is an exotic insect to California, which came into the public eye in 1997 when it was determined to be a vector for Pierce's disease. Because the glassy-winged sharpshooter and Pierce's disease were determined to have the potential to adversely impact California's multi-billion dollar grape and wine industries, urgency legislation was passed and a federal emergency was declared.

With a deadline to produce a report in six weeks, the task force met on four different occasions and received extensive amounts of information on the statewide program, CDFA's strategic alliances, public outreach and education, eradication and prevention methods, biology of the glassy-winged sharpshooter and the program's compliance with the California Environmental Quality Act.

Task force members engaged in candid discussion regarding concerns with the program elements and potential impacts to public health and the environment. Task force members conducted intensive research and unearthed a wealth of information regarding public health and environmental issues. Concerns included the basis for an emergency, compliance with California Environmental Quality Act, adequate public disclosure, pesticide selection and application, the consideration of alternatives to pesticides, and the environmental and public health and safety impact that could result from pesticide use. The meetings culminated with the development of one finding, three consensus recommendations and two minority recommendations delivered to CDFA by the task force. The varying opinions and interests of the task force members led to the incorporation of individual/organization recommendations. Overall, task force members appreciated the opportunity to participate on the task force and convey perspectives on the important environmental and public health issues facing CDFA in its implementation of the statewide program.

This report has been organized in eight sections:

- Section 1 – Introduction** – provides a brief background on the program and the creation of the Glassy-Winged Sharpshooter Environmental Protection Task Force.
- Section 2 -- Task Force Panel** – lists the membership of the task force, their respective organizations and agencies, and a brief description of the mission of each organization/agency.
- Section 3 – Task Force Meetings** – summarizes the program as presented by CDFA staff as well as individual task force member presentations during the four meetings of the task force.
- Section 4 – Task Force Discussions** – outlines the discussions that task force members engaged in as well the general issues and concerns noted by the task force members.
- Section 5 -- Final Recommendations** – lists the five recommendations issued by the task force.
- Section 6 – Individual Member Findings and Recommendations** – incorporates the individual opinions, findings and recommendations made by some of the task force members.
- Section 7 – Report Preparation and Public Comments** – explains the preparation of the report and receipt of task force and public comment.
- Section 8 – Conclusion** – summarizes the few concluding remarks of task force members.

The Glassy-winged Sharpshooter Environmental Protection Task Force, composed of state agency representatives, environmental and public health non-governmental organizations, grower organizations, a university researcher, and a county agricultural commissioner, convened on four occasions in the Fall of 2000 to discuss the potential adverse environmental and public health impacts that could result from the implementation of the California Department of Food and Agriculture's (CDFA) statewide program. This program outlines elements for the eradication and prevention of the occurrence of the glassy-winged sharpshooter and Pierce's disease. The facilitation team of Dale Flowers and Tanya Matson provided meeting facilitation and preparation of this report.

### **Background/History**

CDFA is currently implementing a statewide program that includes prevention, local eradication, and statewide control efforts to combat the glassy-winged sharpshooter and Pierce's disease. The glassy-winged sharpshooter (GWSS) is an exotic insect to California whose presence was discovered in the 1990's. Its presence was not considered significant until 1997, when it was discovered that GWSS was a vector for Pierce's disease. Pierce's disease has been in California for approximately 120 years. Major outbreaks of the disease have occurred in California in the 1880's, 1900's and 1920's. Pierce's disease is caused by bacteria called *Xylella fastidiosa*. In 1999, approximately 300 acres of grapes in Temecula, Riverside County were destroyed by Pierce's disease. As a result, it was determined that GWSS had the potential to adversely impact California's multi-billion dollar grape and wine industries.

In the Fall of 1999, the Legislature became involved in the GWSS issue. At that time, an ad hoc committee was appointed to review existing research programs and identify research needs. AB 1232 established a grants program to fund the research recommended by the ad hoc committee. AB 1232 also authorized the appointment of a Pierce's disease task force to formally recommend funding of specific research projects. In the fall of 1999, CDFA began formulating a comprehensive program, and in early 2000, the elements of that program were implemented.

In May 2000, SB 671, which appropriated \$6.9 million for the first year of eradication and prevention of Pierce's disease and GWSS, was passed by the Senate and sent to the Governor for signature. Due to the urgent nature of the problem, this legislation provided for the establishment of emergency regulations to implement eradication and control measures. At the time of its passing, the legislation did not specify requirements to ensure that the program consider public health and environmental concerns prior to expenditure of the funds. As a result, budget language was adopted which required the Department to "...consult with a task force comprised at a minimum of the Department of Pesticide Regulation, State Water Resources Control Board, Department of Fish and Game, a university-affiliated researcher, a grower, a County Agricultural Commissioner and an environmental or public health non-governmental organization." The language set forth two primary charges for the task force: (1) to "...provide input on potential adverse effects on public health and environment of the application of pesticides, including but not limited to their effects on species and pollinators such as honeybees"; and (2) to "...suggest measures that, in their opinion, would reduce possible harm to public health and the environment while effectively and expeditiously managing this pest threat."

In September 2000, CDFA staff began making contacts with California state agencies to request the participation of representatives with expertise in the environmental and public health matters to be considered. The California Department of Fish and Game, State Water Resources Control Board, and Department of Pesticide Regulation were contacted, in addition to the Department of Conservation and the Department of Health Services. Grower and farm association representatives, public health and environmental advocacy groups, a university researcher and a county agricultural commissioner were also contacted and requested to participate.

These task force members were able to provide their expertise as well as represent the mission and perspectives of their individual agencies and organizations.

### State Agency Representatives

<i>Name</i>	<i>Affiliation</i>	<i>Mission/Department</i>
<i>Brian Finlayson</i>	California Department of Fish and Game 1701 Nimbus Road, Suite F Rancho Cordova, CA 95670 <i>bfinlayson@dfg.ca.gov</i>	To manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public.
<i>Ron Oshima</i>	Department of Pesticide Regulation 1001 "I" Street Sacramento, CA 95814 <i>roshima@cdpr.ca.gov</i>	The Department of Pesticide Regulation regulates all aspects of pesticide sales and use to protect public health and the environment.
<i>Mike Reid</i>	State Water Resources Control Board P.O. Box 944312 Sacramento, CA 95814-2130 <i>reidm@dwq.swrcb.ca.gov</i>	To preserve and enhance the quality of California's water resources and ensure their proper allocation and efficient use for the benefit of present and future generations.
<i>Erik Vink</i>	California Department of Conservation 801 K Street, MS 13-71 Sacramento, CA 95814 <i>evink@consvr.ca.gov</i>	With the economy and environment in mind, the Department of Conservation encourages the responsible use and preservation of California's resources through its programs.
<i>Dr. Rick Kreutzer, M.D.</i>	California Department of Health Services, Environmental Health Investigations Branch 1515 Clay Street, Suite 1700 Oakland, CA 94612 <i>rkreutze@dhs.ca.gov</i>	The mission of the California Department of Health Services is to protect and improve the health of all Californians.

## Environmental and Public Health Non-Governmental Organizations

<i>Name</i>	<i>Affiliation</i>	<i>Mission/Department</i>
<i>John McCaull</i>	Audubon Society 555 Audubon Place Sacramento, CA 95825 <a href="mailto:jmccaull@audubon.org">jmccaull@audubon.org</a>	Work in California to conserve and restore natural ecosystems focusing on birds, other wildlife, and their habitats for the benefit of humanity and the earth's biological diversity.
<i>Linda McElver</i>	Central Coast Canaries 1930 Catillo Court San Luis Obispo, CA 93405 <a href="mailto:lmcelver@hotmail.com">lmcelver@hotmail.com</a>	Advocate for the needs of the chemically sensitive populations.
<i>Ann Maurice</i>	Ad Hoc Committee for Clean Water P.O. Box 484 Occidental, CA 95465 (707) 874-3855	An independent non-profit organization dedicated to open government, fair and rational public policy, protection of public health and welfare including other species, natural resources and wild lands.
<i>Jessica Hamburger</i>	PCL-Pesticide Action Network 49 Powell Street, Suite 500 San Francisco, CA 94102 <a href="mailto:jah@panna.org">jah@panna.org</a>	Pesticide Action Network advances alternatives to the use of pesticides worldwide to promote healthier, more effective pest management through research, policy development, education, media, demonstrations of alternatives and international advocacy campaigns.

## Grower Representatives

<i>Name</i>	<i>Affiliation</i>	<i>Mission/Department</i>
<i>Hank Giclas</i>	Western Growers Association 1005 12 <sup>th</sup> Street, Suite A Sacramento, CA 95814 <a href="mailto:hqiclas@wqa.com">hqiclas@wqa.com</a>	To provide growers of fresh produce in California and Arizona with support programs that could not be generated by any single grower alone.
<i>Ron Macedo / Tess Dunham</i>	California Farm Bureau 1127 11 <sup>th</sup> Street, Suite 627 Sacramento, CA 95814 <a href="mailto:tdunham@CFBF.com">tdunham@CFBF.com</a>	A voluntary, non-governmental, nonpartisan organization of farm and ranch families seeking solutions to the problems that affect their lives, both socially and economically.

## University Representative

<i>Name</i>	<i>Affiliation</i>	<i>Mission/Department</i>
<i>Dr. Les Ehler</i>	University of California, Davis Department of Entomology Davis, CA 95616 <a href="mailto:lehler@ucdavis.edu">lehler@ucdavis.edu</a>	Department of Entomology

## State and Local Government Representatives

<i>Name</i>	<i>Affiliation</i>	<i>Mission/Department</i>
<i>Richard Greek</i>	San Luis Obispo County Department of Agriculture 2156 Sierra Way, Suite A San Luis Obispo, CA 93401 <i>rgreek@co.slo.ca.us</i>	The Department of Agriculture/Measurement Standards is committed to serving the public's interest with a cooperative spirit. We are responsible for insuring equity in the market place for San Luis Obispo County's citizens. This dedicated staff uses their individualized knowledge, abilities and efforts to meet our collective responsibility as defined in our enforcement and service programs.
<i>Gerry Miller</i>	California Department of Food and Agriculture 1220 N Street, Room A-357 Sacramento, CA 95814 <i>gmiller@cdfa.ca.gov</i>	We serve the citizens of California by working to prevent the harm that exotic and important pests can cause. This helps to assure the economic viability and competitiveness of California agriculture; availability of high quality food, fiber, nursery stock, and seed for consumers, and protection of agricultural, natural and urban environments.

## 5. Final Recommendations

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Discussion on the final recommendations primarily focused on the emergency status of GWSS and the CEQA review. Suggested recommendations varied from the discontinuance of the emergency condition as well as cessation of all eradication efforts and release of any research monies until a full CEQA review was completed, to the continuance of the program with the most efficacious and least toxic chemical available for use. Others noted that there was not enough information disclosed to the public to support the determination of an emergency, yet an emergency could still exist and CDFA actions should not cease. However, it was acknowledged that increased public disclosure and review would have given the emergency status a greater degree of validity in the eyes of the public. Still others noted that the emergency status had short-circuited the CEQA process that would have opened up avenues for discussion of alternatives with the public. Ultimately, the task force arrived at a consensus on three recommendations. In addition to the three recommendations, two minority recommendations were proposed. All of the recommendations are set forth below in addition to a notation indicating consensus or favor. It should be noted that not all task force members were present for the entirety of these discussions.<sup>1</sup>

### **Consensus Recommendations**

- CDFA establish and adequately document, within 45 days of receipt of report, the basis for the emergency declaration and conduct and document regular review of the status of GWSS and Pierce's disease in the State of California to determine if an emergency exists and if local control programs are necessary while effectively and expeditiously managing the occurrence and preventing the spread of Pierce's disease using the guiding principle of least possible harm to public health and the environment. – *(Unanimous of those task force members present)*
- CDFA conduct a full review, evaluation, and disclosure of the program, alternatives, and mitigation of potential adverse impacts pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code. – *(Unanimous of those task force members present)*
- CDFA should set the stage for statewide dialogue on the issue of transference of agricultural risk to backyards and private property, beginning with a review of the Food and Agricultural Code, Chapter 6, Abatement Generally, Section 5401, which gives the right to the Secretary of Agriculture and County Agricultural Commissioners to spray private property against the will of the property owner. – *(Unanimous of those task force members present)*

### **Minority Recommendations**

- CDFA declare an end to the emergency status and develop a new program using the guiding principle of least possible harm to public health and the environment while effectively and expeditiously managing the occurrence and preventing the spread of Pierce's disease. – *(Two (2) in favor of those task force members present)*
- No spraying of public or private properties by CDFA. – *(Three (3) in favor of those task force members present)*

<sup>1</sup> Ron Oshima/DPR and Hank Giclas/Western Growers Association were unable to attend the fourth meeting on recommendations. Tess Dunham/California Farm Bureau and John McCaull/Audubon-California attended the meeting, but were unable to be present when consensus recommendations were reached.

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX G**

**MODEL/SAMPLE COUNTY WORKPLAN  
PIERCE'S DISEASE CONTROL PROGRAM 2001/02 WORKPLAN**

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[County Letterhead]

**MODEL/SAMPLE WORKPLAN**  
**PIERCE'S DISEASE CONTROL PROGRAM**  
**2001/02 WORKPLAN**

**Local Assistance**

County of \_\_\_\_\_

Agreement No. \_\_\_\_\_

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**PIERCE’S DISEASE CONTROL PROGRAM**

**MINUTE ORDER OF BOARD OF SUPERVISORS DESIGNATING LOCAL PUBLIC ENTITY PURSUANT TO FOOD AND AGRICULTURAL CODE SECTION 6046(f)**

*[Place copy of Minute Order or Board Resolution here]*

***RECOMMENDED LANGUAGE: The Board of Supervisors of the County of \_\_\_\_\_, State of California, does hereby designate the \_\_\_\_\_ County Agricultural Commissioner to be the local public entity to receive funds allocated by the California Department of Food and Agriculture for local assistance in regard to Pierce’s Disease and its vectors.***

**PIERCE'S DISEASE CONTROL PROGRAM**

**LOCAL PUBLIC ENTITY'S DESIGNATED PIERCE'S DISEASE CONTROL PROGRAM COORDINATOR AND CONTACT INFORMATION**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Fax Number: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

**PIERCE’S DISEASE CONTROL PROGRAM**

**RESPONSE/CONTROL PROGRAM FOR PIERCE’S DISEASE AND ITS VECTORS**

\_\_\_\_\_ COUNTY

(date)

**Objective**

To implement an intergovernmental, coordinated state and community-wide plan to provide detection and delimitation of the glassy-winged sharpshooter (GWSS) in \_\_\_\_\_ County and suppress or eradicate any populations as rapidly as possible.

**RESPONSIBILITIES**

**Lead Agency**

The \_\_\_\_\_ County Department of Agriculture (CDA) is the lead agency and is designated by the \_\_\_\_\_ County Board of Supervisors as the local public entity to conduct the Pierce’s Disease Control Program (PDCP) within the county. The California Department of Food and Agriculture (CDFA) will work in cooperation with the CDA, the State PDCP Science Advisory Panel, officials in affected counties, the \_\_\_\_\_ County PDCP Task Force, and other interested parties in implementing this plan. The CDFA will provide biological control program guidance and support to \_\_\_\_\_ County as favorable agents become available.

**County Responsibilities**

- Act as lead agency for the PDCP activities occurring within the jurisdiction of the county.
- Act as lead liaison to local City Councils, the County Board of Supervisors, county legal counsels, and other county agencies, regarding the PDCP activities.
- Promptly conduct all delimitation and intensive surveys in the county. Additional survey staff may be contracted from the California Conservation Corps. The CDFA will provide on-site expertise, as needed.
- Provide status reports on the results of all surveys, including detailed maps of the surveyed area and infested properties.
- Select appropriate treatments, notify residents, and identify any sensitive sites within the proposed treatment area.
- Direct and coordinate pesticide applications.
- Conduct post-treatment monitoring.

## **ELEMENTS**

### **Delimitation Survey**

The \_CDA will immediately conduct a delimitation survey upon discovery of an infestation. The purpose of the survey is to quickly determine the extent of the infestation. The survey will be conducted in accordance with established CDFA protocols (Attachment 1). Records of properties surveyed and results of the survey (both positive and negative) will be accurately kept.

### **Intensive (Property-by-Property Survey)**

Following the delimitation survey, the \_CDA will complete an intensive survey of all properties within the delimited area to identify the full extent of the infestation.

- Develop and maintain working host records during this intensive survey.
- Develop detailed maps or block folders (property-by-property) of the surveyed and infested area.

### **Treatment Options**

The following treatment information is based on the option of treating all known infested properties. It is intended as a guideline and may be modified to adapt to local and/or changing situations. At all stages of the program, an assessment will be made as to the probability of success. For example, if GWSS is found to be infesting a very large area or is infesting wide areas of sensitive habitat, the \_CDA will immediately consult with the CDFA to determine the preferred course of action.

### **Treatment Material Selection**

A list of registered materials will be reviewed to determine the most appropriate to use based on: 1) registered use as a general treatment for residential plantings; 2) registered on most plant species known to be hosts (feeding and oviposition) for GWSS; and 3) known to control leafhoppers.

### **Threatened/Endangered Species/Environmentally Sensitive Areas**

The \_CDA and the CDFA will identify any threatened/endangered species and/or environmentally sensitive areas within the proposed treatment area before treatments begin. If needed, appropriate mitigation measures will be developed, in consultation with the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and the CDFA, for these sensitive areas. The \_CDA will notify all registered beekeepers near the infested area of the GWSS treatment activities.

## **Public Outreach**

The \_CDA will act as lead spokesperson for the PDCP activities within the county. The \_CDA, in cooperation with the CDFA, will generate press releases and distribute information to all affected communities.

- A telephone help line will be established and staffed to answer calls concerning the PDCP activities. Non-English speakers may be required to adequately staff this help line. The help line will also be coordinated to include public health and animal health information.
- Informational meetings will be held to advise homeowners and other interested parties of treatment activities.

The CDFA will develop technical information and provide technical support and training, assist in the development and dissemination of literature, and act as a clearinghouse for information to the public and the press.

## **Medical/Veterinarian Information**

The \_CDA will contact the \_\_\_\_\_ County Health Officer (\_CHO) with details of any proposed treatment. If the \_CHO has questions about public health aspects of the program, Dr. Peter Kurtz, CDFA's Senior Medical Coordinator, can be contacted at (916) 654-1211.

Questions relating to Animal Health will be referred to CDFA's Animal Health and Food Safety Services at (916) 654-1447. A "Veterinary Fact Sheet" may be prepared and provided for questions relating to pets or livestock.

## **Pre-Treatment Notification**

Pre-treatment notification will be conducted through the local news media and by door-to-door notification.

- Notices will be in languages appropriate to the affected community and will include information regarding material used, precautions, date of application, and a telephone number and contact for the PDCP staff.
- Notices will be given "door-to-door" to infested properties and adjacent properties.

## **General Treatment Procedures**

Treatments will begin following the intensive survey and after all help lines and community relations measures have been taken. Maintenance of good community relations will be essential. All pesticide applications will be made by certified Pest Control Operators under the direction of the \_CDA. Pesticides will be used according to registration and label directions. Sound pesticide safety procedures will be followed.

- Number of applications: Minimum of two.
- Interval: As allowed by label.
- Rate: Follow label directions.
- Post-treatment notice with re-entry statement and pre-harvest interval for treated fruits/vegetables.
- Treatment crews will be properly trained and equipped according to established CDFA protocols for treatment of residential properties.
- Property treatment records will be kept.
- The \_CDA will ensure that all treatment activities are in compliance with all pesticide laws and regulations.

### **Environmental Monitoring**

The CDFA, in cooperation with \_CDA, will arrange for environmental monitoring to be conducted by the California Department of Pesticide Regulation (CDPR), Environmental Monitoring/Pest Management Branch. The \_CDA personnel will work closely with environmental monitoring personnel to identify suitable sites. The following may be monitored

- Surface water, turf, foliage, available fruits and vegetables, outside air and tank mix.
- Identified sensitive areas.

Additional monitoring may be necessary if needs are identified. However, if sufficient data are gathered indicating no adverse environmental impacts, the environmental monitoring may be modified or deleted from the program. This decision will rest with the CDFA and the \_CDA.

### **Post-Treatment Monitoring**

An assessment of the GWSS populations will be conducted on a limited number of selected properties throughout the treatment area to determine the overall effectiveness of the treatments.

- Pre-treatment sampling will be conducted and counts of the GWSS will be made to determine numbers of the GWSS life forms.
- Post-treatment sampling will be conducted using the same protocols to ascertain effectiveness of the treatment(s).

**PIERCE'S DISEASE CONTROL PROGRAM****SURVEY PLAN**

The \_\_\_\_\_ County Department of Agriculture will utilize the CDFA GWSS Statewide Survey Protocols as its survey protocol. These guidelines include minimum requirements to conduct a survey program. The county will submit a written justification (either via e-mail or correspondence) to the Branch Chief of the Pierce's Disease Control Program to request approval to deviate from the GWSS Statewide Survey Protocols.

## PIERCE'S DISEASE CONTROL PROGRAM

### ENFORCEMENT OPTIONS AND AUTHORITIES

The Pierce's Disease Control Program (PDCP) regulations establish the standards for the movement of nursery stock, bulk grapes, and citrus from infested areas to non-infested areas (Section 3658-3660, Title 3, California Code of Regulations). These regulations were established to prevent the artificial spread of glassy-winged sharpshooter (GWSS).

The statutory authority for these regulations is Sections 6045, 6046, and 6047, Food and Agricultural Code (FAC). To enforce these provisions, the Secretary or Agricultural Commissioner is empowered to conduct inspections and investigate any suspected violations; each Commissioner is an enforcing officer for all laws and regulations to prevent the spread of plant pests and to certify shipments of plant material as to its pest freedom.

The FAC provides several options for enforcement of the requirements of the PDCP regulations. This flexibility allows enforcement actions chosen as a result of a violation(s) to be proportionate to the nature/severity of the violation with progressive enforcement for repeat violators.



- Except where otherwise expressly provided, a violation of any provision of this division is a misdemeanor (Section 5027, FAC). In addition to other remedies provided, any person violating the PDCP regulation requirements can be civilly liable up to \$10,000 for each violation (Section 5310, FAC); in lieu of any civil action, the Secretary or Commissioner may level a civil penalty for up to \$2,500 for each violation (Section 5311, FAC).
- Anyone who negligently or intentionally violates a regulation and imports a GWSS-infested plant that results in an infestation, or the spread of an infestation may be civilly liable in an amount up to \$25,000 for each violation [Section 5028(c), FAC].
- It is unlawful to sell any nursery stock without a valid nursery license (Section 6721, FAC). The Secretary can revoke or suspend a nursery license if a nursery has willfully refused to comply with all laws and regulations relative to any pest that might be carried by nursery stock (Section 6761, FAC).
- It is unlawful for anyone to ship, sell, deliver or transport nursery stock in California without either a Hold for Inspection ("blue tag") or a valid nursery stock certificate (Sections 6922 and 6923, FAC). The Commissioner may revoke or suspend the right to use any nursery stock certificate or other shipping permit because of non-compliance (Section 6968, FAC). It is unlawful to alter or otherwise misuse any shipping permit or nursery stock certificate (Section 6927, FAC).
- Any one receiving or moving any nursery stock must notify the Commissioner immediately upon arrival and hold the nursery stock for inspection unless it is accompanied by a valid nursery stock certificate. Some counties have elected to waive that exemption and require GWSS host plant material entering the county (or non-infested area of a county) to be

accompanied by a Warning Hold For Inspection certificate (Section 6505, FAC). In this case, it is unlawful even to move nursery stock within a county without forwarding a manifest specified by Section 6925 and 6926, FAC.

- To facilitate the investigation of violations, proof of ownership is required of any person buying, selling, or transporting a shipment of plant material intended for commercial sale and it is unlawful for any person to alter any proof of ownership document (Sections 5030 and 5031, FAC).
- Under the PDCP regulations, all host plants of GWSS moving from an infested area to a non-infested area must be certified free of GWSS (Sections 3060.2, 3060.4 and 3659, CCR). Certification can be based on surveys confirming non-infested status, inspection, or by approved treatment. It is unlawful to alter or otherwise wrongfully use a certificate (Section 5208, FAC).
- The Secretary or Commissioner may enter into compliance agreements to facilitate the movement of host plant material. The compliance agreement provides the survey, treatment, and handling requirements necessary to assure freedom from GWSS. Violation of the provisions of a compliance agreement is unlawful and any person that violates the provisions of a compliance agreement can also be held liable civilly for up to \$10,000. Remedies provided here do not supersede or limit any and all other remedies available to the State (Section 5705, FAC).
- If a shipment of nursery stock moving *intrastate* is found to be infested with GWSS, or there is reasonable cause to believe that the shipment may be infested, a warning hold order may be placed on the shipment (Section 6521, FAC) specifying the treatment, abatement or return requirements. Similarly, a warning hold may be placed on a shipment *entering* the state if it is found to be infested with GWSS, or there is reasonable cause to believe that the shipment may be infested, with GWSS. It is unlawful, except by written permission, to move or divert, any plant shipment placed under a warning hold order without written permission. It is unlawful to remove, destroy, or otherwise alter any warning hold order (Section 6303, FAC).
- If or when GWSS is found infesting any location, the Secretary or Commissioner may require that any plant, or other GWSS host, be held at that location, and may require any host within five miles of that location be held as well (Section 5701, FAC). It is unlawful to move any plant or host in violation of a hold order (Section 5704, FAC).
- Any location, plants, or other things found infested with GWSS can be considered a public nuisance and may be prosecuted as such and any remedies provided by law for the prevention and abatement of a public nuisance will apply. It is unlawful for any person to maintain a public nuisance. The remedies provided here are in addition to any other applicable remedies (Sections 5401 and 5402, FAC).

**PIERCE'S DISEASE CONTROL PROGRAM****STANDARDS AND RESTRICTIONS**

This workplan does not include any variations from the standards set by law. If the \_\_\_\_\_ County Department of Agriculture (\_CDA) and the \_\_\_\_\_ County PDCP Task Force find that there is clear and convincing evidence to support a more stringent standard than is set by regulation, then the \_CDA will notify the CDFA and provide detailed justification as to the need for the more stringent standard.

**PIERCE'S DISEASE CONTROL PROGRAM****WORKPLAN ASSURANCES**

1. The \_\_\_\_\_ County Department of Agriculture's planned producer outreach and training program in accordance with Food and Agricultural Code Section 6046(h)(1) will be coordinated with CDFA. The development and delivery of producer outreach information and training to local communities, groups, and individuals will be done through public meetings and the local PDCP task force. Efforts will be directed towards raising awareness regarding Pierce's disease and its vectors and workplan involvement through direct mailing, local media, and press releases.
2. The \_\_\_\_\_ County Department of Agriculture's training plan for the Agency's employees in accordance with Food and Agricultural Code Section 6046(h)(2) will be coordinated with CDFA. The biology, survey, and treatment of Pierce's disease and its vectors will be the basic components of the training. Scientific Advisory Panel discussions on GWSS and Pierce's disease will be included in this training for key Agency employees. The University of California Cooperative Extension will be a local resource for training and information for this program.
3. The \_\_\_\_\_ County Department of Agriculture plans to fully participate in the development and implementation of a data collection system in accordance with Food and Agricultural Code Section 6046(h)(5). These activities will be coordinated through CDFA. The data collection system will make it possible to track and report new infestations of Pierce's disease and its vectors in a manner respectful of property and other rights of those affected.
4. The \_\_\_\_\_ County Department of Agriculture will provide monthly program reports via the internet and financial progress reports as per CDFA guidelines.

**PIERCE'S DISEASE CONTROL PROGRAM  
BUDGET/FISCAL DISPLAY**

*[Place budget/fiscal display here]*

**SEE PROCEDURES/GUIDELINES  
ATTACHMENT 1 – SAMPLE BUDGET /FISCAL DISPLAY  
AND ANNUAL SURVEY PLAN**

**PIERCE'S DISEASE CONTROL PROGRAM****LOCAL APPEAL PROCESS**

Pursuant to Section 3651 (c) (3) of the regulations, the \_\_\_\_\_ County Department of Agriculture's Pierce's Disease Control Program Coordinator shall conduct a hearing if any application of the workplan is appealed in writing to him/her or his/her agency. Once the Coordinator receives an appeal, he/she or his/her agent will respond within 10 days to the appellant. The appellant will be given notice as to the date and time for the hearing. At the hearing, the appellant will be given the opportunity to be heard by the Coordinator and to present evidence on matters concerning the application of the workplan. The Coordinator will render a decision and respond to the appellant in writing within 30 days of the hearing. The results of said hearing will be transmitted to CDFA.

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX H**

**GLASSY-WINGED SHARPSHOOTER STATEWIDE SURVEY  
PROTOCOLS FOR 2001**

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# GLASSY-WINGED SHARPSHOOTER STATEWIDE SURVEY / DELIMITATION PROTOCOLS FOR 2001

## SURVEY AREA

Based on the summer 2000 survey, counties within the potential range of the glassy-winged sharpshooter (GWSS) are designated as infested, partially-infested, or apparently free of GWSS. Counties and areas of counties are considered apparently free from GWSS if no established population (5 or more adults within any five-day period and within a 300-yard radius, or the presence of multiple life stages) can be found by survey.

### Infested Counties

Counties in which GWSS is generally distributed include Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties.

### Partially-infested Counties

Limited infestations of GWSS occur in areas of Butte, Contra Costa, Fresno, Kern, Sacramento, Santa Barbara, and Tulare Counties. Other areas of these counties have been surveyed and were found apparently free of GWSS populations.

### Counties Apparently Free Of GWSS

Counties in which GWSS is not known to occur include Alameda, Amador, Calaveras, Colusa, El Dorado, Glenn, Humboldt, Imperial, Kings, Lake, Madera, Marin, Mariposa, Mendocino, Merced, Monterey, Napa, Nevada, Placer, San Benito, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Clara, Santa Cruz, Shasta, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tuolumne, Yolo, and Yuba.<sup>1</sup>

**Survey protocols in this document are intended to provide guidance on how to detect and delimit GWSS populations in the uninfested counties of the state as well as the uninfested portions of partially-infested counties. *Any deviation from these protocols shall be made in consultation with GWSS project management.***

GWSS survey activities in the infested counties and areas are primarily associated with the certification of horticultural and agricultural commodities moving from an infested area into an uninfested area. Survey and monitoring guidelines for these commodities can be found in Nursery Shipping Protocols and various compliance agreements.

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<sup>1</sup> Nine counties are deemed not at risk of becoming infested with GWSS due to unsuitable environments. They are the counties of Alpine, Del Norte, Inyo, Lassen, Modoc, Mono, Pumas, Sierra, and Siskiyou.

## GWSS BIOLOGY

### Hosts

GWSS feeds on and oviposits in a wide variety of plants. The hosts compiled in Appendix A are those plant species on which GWSS life forms have been documented in either California or the southeastern United States. This list is a working document and will continue to expand as more information becomes available.

Citrus is a favored host in southern California but very high sharpshooter populations also have been observed on avocado, crepe myrtle, and several species of woody ornamentals. Other favored introduced plants include eucalyptus and various members of the rose and mallow plant families. Native hosts include both evergreen and deciduous oaks, sycamore, and laurel sumac.

### Life Cycle/Seasonality

#### Southern California

GWSS has two generations per year. Studies in southern California have shown that, although adults are present and must feed throughout the year, **egg-laying activities are either absent or reduced to very low levels during the winter months of December, January, and February. During this same period, the numbers of overwintering adults also decreases.** Egg laying resumes in late February and continues through May. The first generation completes development from late May to late August. Adults from this generation lay egg masses from mid-June through late September, which give rise to overwintering adults. This developmental pattern results in overlapping generations in which each life stage reaches its highest levels at some time from June through October.

#### Northern California

University of California researchers are currently studying the GWSS life cycle in the San Joaquin Valley (SJV). Findings will be released shortly. We assume GWSS populations will follow a life cycle similar to those in southern California including a reduction in adult activity during the winter months. The impact of SJV winter conditions on GWSS life stages also is being investigated.

## SURVEY METHODS

### Visual Searches

Adults, nymphs, nymphal cast skins, egg masses, and egg scars can be found by visually searching plants. Inspections for egg masses and nymphs are best restricted to known oviposition hosts (Attachment A). Old egg scars are the easiest to detect since egg deposition sites are visible on both leaf surfaces. This is not always the case with newly laid eggs, as the raised surface blister (and characteristic waxy covering) is only visible on the undersides of the leaves. Consequently, a representative sample of leaves should be turned over and examined for egg masses. Backlighting against a sunny sky will also help in finding egg masses.

When searching for active life stages on individual plants, certain behavioral characteristics of the sharpshooter can be used to increase the probability of detection. Important traits to consider are:

- 1) adults and older nymphs are primarily stem feeders;
- 2) new flush growth is preferred; and
- 3) on trees, the insects usually select shoots that are growing upward (vertically oriented as opposed to horizontal twigs).

GWSS selects southern exposures. When populations are large and well established, adults are the easiest life stage to detect because they are highly visible when flying around or between their host plants. Flight activity is most pronounced during the late morning and afternoon hours; therefore, surveys should be conducted during the warmer parts of the day, if practical. Correct timing is particularly critical if adult numbers are low. At low densities and during cooler times of the day, nets may be used to agitate foliage causing cryptic adults to take flight.

**Planning your visual survey:** Since GWSS has been present in southern California for at least a decade, some artificial movement has occurred via transport of infested plant materials. Areas at risk are those which have been landscaped with host material within the past 10 years and include housing tracts, industrial and commercial developments, public and private recreational areas, greenways, and ornamental plantings found along in-city roadways.

An efficient time period for looking at host plants is 10-15 minutes per urban property.

### Nets and Beating Sheets

Enhance the visual search of host plants by using insect nets (aerial and sweep) and beating sheets. The effectiveness of these devices is largely dependent on the type and density of GWSS life stages present. Either aerial or sweep nets can be used to capture adults, but aerial ones are often more effective since they are lighter, more maneuverable, have larger openings, and are often equipped with longer handles.

Retrieval of specimens from aerial nets is also more efficient as captured individuals are always visible.

**Sweep nets** are constructed of sturdy, durable materials and designed to quickly sample a wide variety of short (generally four feet or less in height), woody, and herbaceous plants, such as those found in nurseries. Sweep nets should always be used to augment visual examinations of plants since adults may be widely scattered and sitting on non-host plants. However, care must be exercised when using these nets so that certain tender plants are not injured. Sweeping is most likely to capture adults and/or nymphs when temperatures are below 60 degrees F. As temperatures warm, adults are less likely to be caught by sweeping but this activity will cause adults to fly making them easier to see. Adults can also be stirred up by-agitating foliage with net handles or lightly jarring foliage or plant containers. Adults are usually difficult to net in flight so they should be followed to their landing sites, dislodged into a net, and then collected into alcohol.

**Beating sheets** are also an excellent tool because they: 1 ) are more effective (as compared to a sweep net) in direct sampling of highly suspect plant parts, such as erect flush growth; and 2) permit the rapid discovery of nymphs and their cast skins. They also help facilitate the capture of nymphs because nymphs often will remain on the sheet long enough to allow collection; they don't fly away. Beating sheets are most effective early in the day when temperatures are low and the insects are less active.

## Traps

Yellow sticky traps are generally not as effective as visual surveys, but they have occasionally detected the presence of sharpshooters when other survey techniques have failed. Panels measuring a minimum of 5" X 9" are the trap of choice for GWSS. Remember that these traps are not very attractive so proper deployment is essential.

GWSS adults have also been recovered from other sticky traps, i.e., Jackson trap inserts, suggesting that other traps with sticky components may also capture sharpshooters. Therefore, after removal from the field, all insect detection traps within the survey area should be routinely screened for GWSS. This includes all traps deployed for detection of exotic pests in urban areas including the sticky inserts from Jackson traps, any yellow stick panel traps, and Japanese beetle traps. We need to seek the cooperation of university extension and research personnel, private contractors and consultants (Pest Control Advisors), and growers who use similar traps for monitoring, controlling, or export certification in orchards, vineyards, and ornamental crops.

The flight temperature threshold for GWSS is approximately 65° F. Trapping will not be an effective survey method during periods when temperatures are lower than this threshold.

## **SURVEY PROTOCOLS FOR NON-INFESTED AND PARTIALLY INFESTED COUNTIES**

The protocols in this document are intended to serve as guidelines to detect and delimit infestations of the GWSS in urban, nursery, cropland, and natural (riparian) settings in California. Any deviation from these protocols shall be made in consultation with GWSS project management. Post- treatment surveys have not yet been developed.

### **URBAN/RESIDENTIAL**

#### **DETECTION SURVEY**

##### **Yellow Panel Traps**

*Trapping Season:* March 1 (based on local conditions)- October 31.

*Trap Density:* Use a minimum of five traps per square mile in residential/urban areas (with more than 500 residences per square mile). Traps should also be deployed in Rural Residential areas at the same density as Medfly/Jackson traps. Residences per square mile and their recommended trap density are:

301-500 residences = four (4) traps;  
151-300 residences = three (3) traps;  
51-150 residences = two (2) traps;  
25-50 residences = one (1 ) trap.

Rural areas with 25 or less homes per square mile should not be trapped unless they are at risk for colonization by GWSS.

*Hosts:* Preferred hosts should always be selected for trap deployment. Crape myrtle is an excellent host and should be utilized when available.

Good spring hosts include citrus, euonymus, and early stone fruits in the spring; apricot, carob, citrus, euonymus, grape, mulberry, plum, red bud, and, sunflower are recommended in the summer; and citrus and eucalyptus in the fall. Other locally favored hosts may be utilized for trap placement.

*Trapping Sites:* Irrigated areas with a diversity of plants which include multiple preferred hosts should be selected whenever possible. GWSS trapping may be conducted as a separate activity or may be incorporated into general detection trapping activities, whichever is most appropriate for local conditions. However, GWSS traps should not be placed on the same host as medfly traps, since the host preferences of these two

insects are different. GWSS trappers will be trained to recognize detection target pests, since these exotics may be captured on yellow panel traps.

*Trap Placement:* GWSS are found primarily in the outer canopy of host trees. Traps deployed in individual trees should be positioned in a highly visible position (not hidden in the foliage) and placed in or near an area of vigorous, upright growth on the warmest part of the tree. If practical, traps can be hung on a pole in the open near a preferred feeding host.

*Trap Servicing Interval:* Traps shall be inspected at least once every two weeks.

*Trap Relocation and Replacement:* Yellow panel traps should be relocated every six weeks to another host at least 300 feet away during the trapping season. A new trap should be utilized at the time of each relocation. If traps are excessively dirty, they can be replaced at two to three week intervals.

## **Visual Surveys**

*Season:* March 1 - October 31.

*Sites:* Visual surveys for all life stages of GWSS should be conducted in all at-risk ornamental plantings containing sharpshooter hosts. Areas chosen shall be at the discretion of the local agricultural commissioner and in consultation with GWSS project management. In general targeted areas shall include residential developments, malls, industrial and community parks, golf courses, cemeteries, landscaped median strips, border plantings along major urban thoroughfares, and rights of way along major state highways. Right-of-way surveys are linear and should be treated as transects. Transects should be sampled at a minimum of five sites per linear mile each year. Grid surveys should be designed to adequately sample both the area and diversity of hosts found in each type of ornamental planting. Yellow panel traps may be utilized to augment visual searches via deployment in areas not sampled by the grid or transect.

## **High Risk Areas**

Areas considered most at risk and their recommended survey guidelines are enumerated below.

- (1) All residential properties (regardless of age) located adjacent to/surrounding high-risk nurseries -- recommendation: a minimum of 10% of included properties should be surveyed annually;
- (2) All new (three years old or less) commercial and residential developments – recommendation: (a) conduct 100% visual inspection of all business/commercial developments, (b) sample a minimum of 10% of each residential development targeting properties with preferred hosts, continue sampling annually if substantial development

is continuing, if nothing is detected after three years of survey convert to monitoring the development by using yellow panel traps at the appropriate urban density.

#### Other Urban Areas

Visual surveys can also be conducted in older neighborhoods to insure that GWSS has not been introduced by individual plant replacement or via other re-landscaping activities. Urban grid shall be utilized to detect GWSS infestations in such residential areas. (See Appendix B)

### **DELIMITATION SURVEY**

Any detection of GWSS not associated with a recently arrived or incoming nursery/landscaping shipment from an infested area shall trigger a delimitation survey. Due to the inability of the yellow panel trap to adequately (and rapidly) detect low-level populations, the following visual survey method shall be utilized.

#### ***Visual Survey***

All (100%) of the properties shall be surveyed within a  $\frac{1}{4}$  mile radius of the initial find. Additional find locations shall be used as the epicenter to expand survey boundaries using a  $\frac{1}{4}$  mile radius. Initial surveys should be door-to-door moving outward in all directions from the original find site. If high or scattered sharpshooter populations are found in the initial inspections it may be advisable to conduct a "leap-frog" survey to rapidly determine the possible extent of the infestation. This involves running N,S,E,W oriented transects (as appropriate to the local conditions) and inspecting a minimum of ten properties per lineal  $\frac{1}{4}$  mile. Continue inspecting outward until no sharpshooters are found on two consecutive blocks. Use the last block with finds to define the area to be subjected to a property-by-property search. If the infestation is highly localized the search area may be restricted to the area circumscribed by the original  $\frac{1}{4}$  mile radius. When running transect surveys special bias should be placed on properties with highly favored hosts present (ie., crepe myrtle, citrus, red bud, carob, eucalyptus etc.). Records of inspected properties should be maintained in such a manner to prevent revisiting previously inspected ones during the follow-up 100% survey.

## **NURSERIES**

Nursery stock represents a significant pathway for the introduction of GWSS into new areas. All nurseries that receive plant shipments from GWSS infested areas should be considered at high risk.

### **DETECTION SURVEY**

#### **Yellow Panel Traps**

*Trapping Season:* High-risk nurseries should be trapped year-round.

*Trap Density:* Place 2 to 5 traps per acre depending on perceived risk.

*Hosts:* Preferred feeding hosts should be selected whenever possible (Appendix A).

*Selection of Trapping Sites:* Traps should be uniformly placed throughout the nursery. Place traps in each of the canopies when multiple plant canopies are present. Traps should be placed well within the nursery not at the fence (property) line. Traps can be placed in/around holding areas designated for incoming shipments.

*Trap Placement:* Position traps in the upper outer canopy, in a highly visible position (not hidden in the foliage) near vigorous, upright growth on the warmest side of the host. If plants are short, Japanese beetle rods, wooden stakes or poles can be used to secure the trap at or just above the canopy of nearby host plants.

*Trap Servicing Interval:* Inspect traps weekly or biweekly at the discretion of the commissioner.

*Trap Relocation:* It is not necessary.

*Trap Replacement:* Traps should be replaced every six weeks or sooner if needed.

#### **Visual Survey**

*Current inventory:* Each high-risk nursery shall be visually surveyed once each year to confirm it is still GWSS free. This inspection should be conducted during the summer months (June, July, August).

## **NURSERIES**

### **DELIMITATION SURVEY**

The detection of a GWSS not associated with a recent shipment from an infested area shall trigger a delimitation survey using the delimitation protocols outlined in the Urban/Residential Section. All plants within the 1/4 mile radius of the original detection site shall be inspected. This includes all plants within the nursery, and at/in any residences, croplands or riparian habitats that fall within the designated delimitation boundaries.

#### **Yellow Panel Traps**

Trap Density:

Core = 10 traps/acre;

Core-Area: A 300-foot radius (8.3 acres or 600' on a side) centered on the GWSS detection site.

Buffer = 5 traps/acre.

Buffer zone: An area surrounding the core formed by a 150-foot extension beyond the core area boundaries. This area is approximately 10.3 acres.

Servicing Schedule: First Week - Core traps checked daily; buffer traps checked twice per week. Second Week - Core and buffer traps checked twice per week. Third and fourth Weeks - Core and buffer traps checked once per week.

If no additional GWSS are found, the trap density and servicing schedules will revert to detection protocols.

# CROPLAND

## DETECTION SURVEY

A cropland survey shall be conducted in the following areas:

- (1) all commercial plantings of *Citrus* spp., *Vitis* spp., and *Prunus* spp. which are within 1/4 mile of landscaped residential developments, business parks, shopping centers and recreational sites;
- (2) citrus orchards adjacent to packing houses and host plantings (i.e., eucalyptus, oleander) along major routes used to transport citrus to packing facilities; and

If traps are utilized, they should be deployed at a minimum density of one per 120 acres. Trap from April through October, relocating the trap into a new 20-acre subquadrant every six weeks. Service every two to three weeks. Use a new trap at the time of each relocation; replace traps as needed. Traps deployed in Citrus and Prunus should be placed in the upper canopy near flush foliage in exposed positions (not inside the foliage). Smaller rapidly growing trees inter-planted within groves of mature trees have also been observed with high numbers of adult GWSS and may represent the best sites for visual inspections or trap deployment.

- (3) all the remaining citrus groves in each county and any other established or new commercial plantings determined to be a risk by the county agricultural commissioner.

Deploy traps at a minimum density of one per 240 acres using the above guidelines for citrus. Trap from April through October, relocating the trap into a new 40-acre subquadrant every six weeks. Service every two to three weeks. Use a new trap at the time of each relocation; replace traps as needed.

The following protocols shall be used to survey subsections (1) and (2) described above. The risk assessment of sites to be surveyed under subsection (3) shall be made by the agricultural commissioner in collaboration with GWSS program personnel.

### **Subsections 1 & 2**

#### **Visual Surveys**

Conduct visual searches for all life stages in cropland borders which are adjacent to possible GWSS introduction sites. Depending on the nature of the crop (orchard vs. vineyard), searches shall be conducted up to 300 feet into each planting along the border(s). Sample/inspect a minimum of 10% of the plants in these border rows. If practical, sampling should be done when adults are active as they will be easier to detect at low population densities. Surveys should be conducted annually. Visual

searches shall be the definitive survey method. At the discretion of the agricultural commissioner, yellow panel traps may be used to monitor croplands prior to the completion of the visual searches.

### **Yellow Panel Traps**

*Selection of Trapping Sites:* If traps are deployed sites should be selected along heavily traveled routes leading from *infested sites*. Traps should be placed at a minimum of two per lineal mile and deployed in the second border row in order to avoid exposure to dirt and dust along major routes. Trees next to orchard roads should be avoided. See below for trapping packing houses.

*Trap Placement:* In orchards/groves, traps should be placed in the upper outer canopy in exposed positions near upright, vigorously growing foliage on the warmest side of the host plant. Smaller, rapidly growing trees inter-planted within groves of mature trees often are highly attractive to adult sharpshooters because of their flush growth. In vineyards, stakes or poles should be used to suspend the traps just above the leaf canopy.

*Trap Servicing Interval:* Service traps every two to three weeks.

*Trap Relocation:* Every six weeks into a new twenty acre subquadrant.

*Trap Replacement:* Replace traps at six-week intervals or sooner if needed.

### **Subsection 3**

Other crop plantings may be designated for survey based on the degree of risk as assessed by the local agricultural commissioner. Incorporation of these plantings into the county survey plan shall be made after consultation with, and approval by, GWSS program personnel.

Survey guidelines for these "at risk" plantings shall be determined by local circumstances but should minimally include: (1) visual survey of 10% of each planting; and (2) yellow panel trap monitoring at a density of one trap per 40 acres or less.

### **DELIMITATION SURVEY**

Any detection of GWSS in crops shall be delimited as outlined in the Urban/Residential Section. This shall include all host crops as well as host materials found in dooryards or riparian habitats which fall within the prescribed survey boundaries.

## **Yellow Panel Traps**

*Core:* 8.3-acre

Use 3 traps per acre (Total traps required = 25).

*Buffer:* 10.3-acre

Use 2 traps per acre (Total traps required = 20).

*Remainder of Block:* Use 1 trap up to 40 acres or less (Total traps required dependent on size of planting)

## **NATURAL / RIPARIAN HABITATS**

Survey of natural/riparian habitats shall be at the discretion of the local agricultural commissioner in consultation with GWSS project management. As a general rule only those natural areas which border new (three year old or less) developments would be considered for survey.

## **PACKING HOUSES AND PROCESSING FACILITIES**

It has been suggested that hitchhiking adult GWSS may be transported to winery locations in gondolas of harvested grapes or to citrus packing houses via bins of citrus. Monitoring of wine grape gondolas in 2000 indicated that this may not be a viable, artificial pathway for movement of GWSS. However, GWSS has been found in citrus transport bins, and subsequently inside packing houses receiving those bins, when infested citrus groves are harvested during cool/cold weather conditions.

Yellow panel traps should be placed in and around citrus packing facilities throughout the harvest season, to serve as an early warning system to detect the presence of GWSS in incoming loads of citrus. Two to five traps per packing facility should be utilized.

## **NATURAL DISPERSAL ROUTES**

Natural dispersal pathways by which GWSS can extend its range need to be monitored each year. The known leading edges of these invading populations are located in southern Santa Barbara, and parts of Kern, Tulare, Fresno, and Sacramento Counties.

Sampling of vegetation along major routes can serve to monitor such movements. Surveys should be undertaken along the following corridors:

- (1) Highway 101 from Goleta north to Buellton;
- (2) Highway 1 north to Lompoc; and
- (3) Highway 154 from Santa Barbara into the Santa Ynez Valley.

Five sites per lineal mile should be surveyed along these routes utilizing visual searches and yellow panel traps.

The citrus belt which extends along the western foothills of the Sierras from northern Kern County into southern Fresno County also represents a significant pathway by which GWSS could disperse. Grid surveys utilizing both visual inspections and yellow panel trapping need to be conducted in this part of the San Joaquin Valley especially in northern Kern County and adjacent plantings in southern Tulare County.

### **QUALITY CONTROL OF GWSS TRAPPING PROGRAM**

Maximizing the probability of GWSS using yellow panel traps requires that field personnel select good trap sites, properly place and service traps, keep complete and accurate records and quickly recognize any trapped targeted insect pests. To evaluate these program elements GWSS management will institute a quality control program which includes the field inspection and evaluation of detection sites/traps, the examination of records at field stations and the periodic "planting" of sharpshooter specimens.

## **GWSS SPECIMEN COLLECTION AND IDENTIFICATION**

All suspect GWSS specimens shall be submitted to the Plant Pest Diagnostics Center in Sacramento or submitted to the local county agricultural commissioner for submission to the Center for confirmation. This is particularly important for specimens which represent new distributional and host records and those which will be used as the basis for regulatory actions.

Specimen Collection and Submission of Samples – Leaves with suspect viable egg masses should be placed in sealed plastic bags. Free-living adults and nymphs should be killed by placing them in vials containing 70% alcohol. These containers should have tight fitting corks or screw top lids to prevent the loss of specimens or preservative during transit to the laboratory. Suspect adults on sticky traps can be submitted by either sending the entire trap or by cutting out and sending the portion of the trap containing the suspect sharpshooter. Do not cover trap surfaces with clear plastic. Prior to shipment, yellow panel traps should be reversed so that the sticky surfaces are on the inside and a rubber band placed around the outside to hold the two halves in position. Care should be taken to insure that the sticky surfaces are not in contact. Sticky traps should be placed in sealed plastic bag(s) before packaging. "Cut-outs" should be placed in dry plastic vials and sized to fit tightly inside so that neither the specimen nor the "stickem" comes in contact with the inner surface of the container. Use a Standard Form 65-020, "Pest and Damage Record" (PDR), when sending specimens for identification.

## APPENDIX A

### Sorted by Scientific Name: Scientific Name Common Name

Oviposition hosts are indicated with an asterisk.

Abelia spp.*	Abelia*	Cercis spp.*	Redbud*
Acacia spp.*	Acacia*	Chenopodium spp.*	Lambsquarter*
Aeschynanthus spp.*	Basket plant*	Chorisia spp.*	Floss-silk tree*
Agapanthus spp.*	Agapanthus*	Chrysanthemum spp.*	Chrysanthemum*
Agonis spp.*	Willow myrtle*	Cinnamomum spp.*	Cinnamomum*
Albizia spp.	Albizzia	Cissus spp.*	Grape Ivy*
Aleurites spp.	Aleurites	Cistus spp.*	Rock rose*
Alnus spp.*	Alder*	Citrus spp.*	Citrus*
Althaea spp.*	Hollyhock*	Clytostoma spp.*	Clytostoma*
Amaranthus spp.*	Amaranth*	Coprosma spp.*	Coprosma*
Ambrosia spp.	Ragweed	Cordyline spp.*	Dracaena*
Ananas spp.*	Ananas*	Cornus spp.*	Dogwood
Annona spp.*	Annona (cherimoya)*	Cotoneaster spp.	Cotoneaster
Antirrhinum spp.*	Snapdragon*	Cupaniopsis spp.*	Cupaniopsis*
Aptenia spp.*	Aptenia*	Cycas spp.*	Cycad*
Arbutus spp.*	Strawberry tree*	Dietes spp.*	Dietes*
Archontophoenix spp.*	Seaforthia*	Diospyros spp.*	Persimmon*
Asclepias spp.*	Milkweed*	Elaeagnus spp.	Elaeagnus
Asparagus spp.	Asparagus	Elaeocarpus spp.*	Elaeocarpus*
Aspidistra spp.*	Iron Plant*	Erigeron spp.	Fleabane
Baccharis spp.*	Baccharis*	Eriobotrya spp.*	Eriobotrya*
Bauhinia spp.*	Bauhinia*	Erythrina spp.*	Coral tree*
Betula spp.*	Birch*	Escallonia spp.*	Escallonia*
Bigonia spp.*	Bigonia*	Eucalyptus spp.*	Eucalyptus*
Bougainvillea spp.*	Bougainvillea*	Eugenia spp.*	Eugenia*
Brachychiton spp.*	Bottle tree*	Euonymus spp.*	Euonymus*
Brunfelsia spp.*	Brunfelsia*	Eupatorium spp.	Boneset
Buxus spp.*	Boxwood*	Feijoa spp.*	Feijoa*
Calliandra spp.*	Powderpuff*	Ficus spp.*	Fig*
Calodendrum spp.*	Cape Chesnut*	Fraxinus spp.*	Ash*
Camellia spp.*	Camellia*	Gardenia spp.*	Gardenia*
Campsis spp.*	Trumpet creeper*	Geijera spp.*	Geijera*
Canna spp.*	Canna*	Gelsemium spp.*	Yellow jessamine*
Carica spp.*	Papaya*	Ginkgo spp.*	Ginkgo*
Capsicum spp.*	Pepper, chile*	Gladiolus spp.	Gladiolus
Cassia spp.*	Senna*	Gossypium spp.	Cotton
Castanopsis spp.*	Chinquapin*	Grewia spp.*	Grewia spp.*
Catalpa spp.*	Catawba*	Hardenbergia spp.*	Hardenbergia*
Ceratonia spp.*	Carob*	Hedera spp.*	Ivy*
		Helianthus spp.*	Sunflower*
		Heteromeles spp.*	Toyon*
		Hibiscus spp.*	Hibiscus*
		Howea spp.*	Sentry palm*
		Hymenoporum spp.*	Hymenoporum*

Ilex spp.\* Holly\*  
Jacaranda spp.\* Green ebony\*  
Jasminum spp. Jasmine  
Juglans spp. Walnut  
Koelreuteria spp.\* Golden-rain tree\*  
Lactuca spp. Lettuce  
Lagerstroemia spp.\* Crape myrtle\*  
Lantana spp.\* Shrub Verbena\*  
Laurus spp. \* Laurel\*  
Ligustrum spp.\* Privet\*  
Limonium spp.\* Statice \*  
Liquidambar spp.\* Sweet gum\*  
Liriodendron spp.\* Tulip tree\*  
Macadamia spp.\* Macadamia\*  
Magnolia spp.\* Magnolia\*  
Malus spp. Apple  
Malva spp. Mallow  
Maytenus spp.\* Maytenus\*  
Melaleuca spp.\* Honey myrtle\*  
Melia spp. Chinaberry  
Metrosideros spp.\* Bottlebrush\*  
Michelia spp.\* Champak\*  
Mirabilis spp.\* Umbrella wort\*  
Monarda spp. Wild bergamot  
Morus spp.\* Mulberry\*  
Myoporum spp.\* Myoporum\*  
Myrtus spp.\* Myrtle\*  
Nandina spp.\* Nandina\*  
Nephrolepis spp.\* Sword fern\*  
Nerium spp.\* Oleander\*  
Nicotiana spp.\* Tree tobacco\*  
Nyssa spp. Tupelo  
Oenothera spp. Evening primrose  
Olea spp.\* Olive\*  
Opuntia spp.\* Cactus\*  
Osmanthus spp.\* Osmanthus\*  
Pandorea spp.\* Pandorea\*  
Persea spp.\* Avocado\*  
Philadelphus spp.\* Mock orange\*  
Philodendron spp.\* Philodendron\*  
Phoenix spp.\* Date palm\*  
Phormium spp.\* Flax lily\*  
Photinia spp.\* Photinia\*  
Phytolacca spp. Pokeweed  
Pinus spp. Pine  
Pistacia spp.\* Pistachio\*

Pittosporum spp.\* Pittosporum\*  
Platanus spp.\* Sycamore\*  
Plumbago spp.\* Leadwort\*  
Podocarpus spp.\* Podocarpus\*  
Polygala spp.\* Milkwort\*  
Populus spp.\* Cottonwood\*  
Protea spp.\* Protea\*  
Prunus spp.\* Prunus\*  
Punica spp.\* Pomegranate\*  
Pyracantha\* Pyracantha/Firethorn\*  
Pyrus spp.\* Pear\*  
Quercus spp.\* Oak\*  
Raphiolepis spp.\* Raphiolepis\*  
Rhamnus spp.\* Buckthorn\*  
Rhododendron spp.\* Azalea\*  
Rhus spp.\* Sumac\*  
Robinia spp.\* Locust\*  
Rosa spp.\* Rose\*  
Rubus spp. Blackberry  
Rudbeckia spp. Coneflower  
Salix spp.\* Willow\*  
Sambucus spp.\* Elderberry\*  
Sapium spp.\* Sapium\*  
Sassafras spp. Sassafras  
Schefflera spp.\* Umbrella tree\*  
Schinus spp.\* Schinus\*  
Simmondsia spp.\* Jojoba\*  
Solanum spp.\* Solanum\*  
Solidago spp. Goldenrod  
Sonchus spp. Sonchus  
Sorghum spp.\* Sorghum\*  
Strelitzia spp.\* Bird of paradise\*  
Syringa spp.\* Lilac\*  
Tabebuia spp.\* Trumpet Tree\*  
Tecomaria spp. Tecomaria  
Thuja spp. Arborvitae  
Tipuana spp.\* Tipu Tree\*  
Trachelospermum spp\*  
Trachelospermum\*  
Tristania spp.\* Tristania\*  
Tulbaghia spp.\* Tulbaghia\*  
Tupidanthus spp.\* Tupidanthus\*  
Ulmus spp.\* Elm\*  
Veronica spp.\* Speedwell\*  
Viburnum spp.\* Viburnum\*  
Vigna spp. Vigna

Viola spp.\* Violet\*  
 Vitis spp.\* Grape\*  
 Wisteria spp.\* Wisteria\*  
 Xanthium spp. Cocklebur  
 Xylosma spp.\* Xylosma\*  
 Yucca spp. Yucca  
 Zantedeschia spp.\* Calla lily\*  
 Zea spp. Zea

**Sorted by Common Name:**  
**Common Name Scientific Name**

Abelia\* Abelia spp.\*  
 Acacia\* Acacia spp.\*  
 Agapanthus\* Agapanthus spp.\*  
 Albizia Albizia spp.  
 Alder\* Alnus spp.\*  
 Aleurites Aleurites spp.  
 Amaranth\* Amaranthus spp.\*  
 Ananas\* Ananas spp.\*  
 Annona (cherimoya)\* Annona spp.\*  
 Apple Malus spp.  
 Aptenia\* Aptenia spp.\*  
 Arborvitae Thuja spp.  
 Ash\* Fraxinus spp.\*  
 Asparagus Asparagus spp.  
 Avocado\* Persea spp.\*  
 Azalea\* Rhododendron spp.\*  
 Baccharis\* Baccharis spp.\*  
 Basket plant\* Aeschynanthus spp.\*  
 Bauhinia\* Bauhinia\*  
 Bead tree Melia spp.  
 Bigonia\* Bigonia spp.\*  
 Birch\* Betula spp.\*  
 Bird of paradise\* Strelitzia spp.\*  
 Blackberry Rubus spp.  
 Boneset Eupatorium spp.  
 Bottle tree\* Brachychiton spp.\*  
 Bottlebrush\* Metrosoides spp.\*  
 Bougainvillea\* Bougainvillea spp.\*  
 Boxwood\* Buxus spp.\*  
 Brunfelsia\* Brunfelsia spp.\*  
 Buckthorn\* Rhamnus spp.\*  
 Cactus\* Opuntia spp.\*  
 Calla lily\* Zantedeschia spp.\*  
 Camellia\* Camellia spp.\*  
 Canna\* Canna spp.\*

Carob\* Ceratonia spp.\*  
 Catawba\* Catalpa spp.\*  
 Champak\* Michelia spp.\*  
 Cape Chestnut\* Calodendrum spp.\*  
 Cheeseweed Malva spp.  
 Chinquapin\* Castanopsis spp.\*  
 Chrysanthemum\* Chrysanthemum spp.\*  
 Cinnamomum\* Cinnamomum spp.\*  
 Citrus\* Citrus spp.\*  
 Clytostoma\* Clytostoma spp.\*  
 Cocklebur Xanthium spp.  
 Coneflower Rudbeckia spp.  
 Coprosma\* Coprosma spp.\*  
 Coral Tree\* Erythrina spp.\*  
 Cotoneaster Cotoneaster spp.  
 Cotton Gossypium spp.  
 Cottonwood\* Populus spp.\*  
 Crape myrtle\* Lagerstroemia spp.\*  
 Cupaniopsis\* Cupaniopsis spp.\*  
 Cycad\* Cycas spp.\*  
 Date palm\* Phoenix spp.\*  
 Dietes\* Dietes spp.\*  
 Dogwood\* Cornus spp.\*  
 Dracaena\* Cordyline  
 Elaeagnus Elaeagnus spp.  
 Eleaocarpus\* Eleaocarpus spp.\*  
 Elderberry\* Sambucus spp.\*  
 Elm\* Ulmus spp.\*  
 Eriobotrya\* Eriobotrya spp.\*  
 Escallonia\* Escallonia spp.\*  
 Eucalyptus\* Eucalyptus spp.\*  
 Eugenia\* Eugenia spp.\*  
 Euonymus\* Euonymus spp.\*  
 Evening primrose Oenothera spp.  
 eijoa\* Feijoa spp.\*  
 Fig\* Ficus spp.\*  
 Fire thorn\* Pyracantha spp.\*  
 Flax lily\* Phormium spp.\*  
 Fleabane Erigeron spp.  
 Floss-silk tree\* Chorisia spp.\*  
 Gardenia\* Gardenia spp.\*  
 Geijera\* Geijera spp.\*  
 Gingko\* Gingko spp.\*  
 Gladiolus Gladiolus spp.  
 Golden-rain tree\* Koelreuteria spp.\*  
 Goldenrod Solidago spp.

Grape ivy\* *Cissus* spp.\*  
 Grape\* *Vitis* spp.\*  
 Green ebony\* *Jacaranda*\*  
 Grewia\* *Grewia* spp.\*  
 Hardenbergia\* *Hardenbergia* spp.\*  
 Hibiscus\* *Hibiscus* spp.\*  
 Holly\* *Ilex* spp.\*  
 Hollyhock\* *Althaea* spp.\*  
 Honey myrtle\* *Melaleuca* spp.\*  
 Hymenoporum\* *Hymenoporum* spp.\*  
 Iron Plant\* *Aspidistra* spp.\*  
 Ivy\* *Hedera* spp.\*  
 Jasmine *Jasminum* spp.  
 Jojoba\* *Simmondsia* spp.\*  
 Lambsquarter\* *Chenopodium* spp.\*  
 Laurel\* *Laurus* spp.\*  
 Leadwort\* *Plumbago* spp.\*  
 Lettuce\* *Lactuca* spp.\*  
 Lilac\* *Syringa* spp.\*  
 Locust\* *Robinia* spp.\*  
 Macadamia\* *Macadamia* spp.\*  
 Magnolia\* *Magnolia* spp.\*  
 Mallow *Malva* spp.  
 Maytenus\* *Maytenus* spp.\*  
 Milkweed\* *Asclepias* spp.\*  
 Milkwort\* *Polygala* spp.\*  
 Mock orange\* *Philadelphus* spp.\*  
 Mulberry\* *Morus* spp.\*  
 Myoporum\* *Myoporum* spp.\*  
 Myrtle\* *Myrtus* spp.\*  
 Nandina\* *Nandina* spp.\*  
 Oak\* *Quercus* spp.\*  
 Oleander\* *Nerium* spp.\*  
 Olive\* *Olea* spp.\*  
 Osmanthus\* *Osmanthus* spp.\*  
 Pandorea\* *Pandorea* spp.\*  
 Papaya\* *Carica* spp.\*  
 Pear\* *Pyrus* spp.\*  
 Pepper, chile\* *Capsicum* spp.\*  
 Persimmon\* *Diospyros* spp.\*  
 Philodendron\* *Philodendron* spp.\*  
 Photinia\* *Photinia* spp.\*  
 Pine *Pinus* spp.  
 Pistachio\* *Pistacia* spp.\*  
 Pittosporum\* *Pittosporum* spp.\*  
 Podocarpus\* *Podocarpus* spp.\*  
 Pokeweed *Phytolacca* spp.  
 Pomegranate\* *Punica* spp.\*  
 Powderpuff\* *Calliandra* spp.\*  
 Privet\* *Ligustrum* spp.\*  
 Protea\* *Protea* spp.\*  
 Prunus\* *Prunus* spp.\*  
 Ragweed *Ambrosia* spp.  
 Raphiolepis\* *Raphiolepis* spp.\*  
 Redbud\* *Cercis* spp.\*  
 Rock rose\* *Cistus* spp.\*  
 Rose\* *Rosa* spp.\*  
 Sapium\* *Sapium* spp.\*  
 Sassafras *Sassafras* spp.  
 Schinus\* *Schinus* spp.\*  
 Seafortia\* *Archontophoenix* spp.\*  
 Senna\* *Cassia* spp.\*  
 Sentry palm\* *Howea* spp.\*  
 Shrub verbena\* *Lantana* spp.\*  
 Snapdragon\* *Antirrhinum* spp.\*  
 Solanum\* *Solanum* spp.\*  
 Sonchus *Sonchus* spp.  
 Sorghum\* *Sorghum* spp.\*  
 Speedwell\* *Veronica* spp.\*  
 Statice\* *Limonium* spp.\*  
 Strawberry tree\* *Arbutus* spp.\*  
 Sumac\* *Rhus* spp.\*  
 Sunflower\* *Helianthus* spp.\*  
 Sweetgum\* *Liquidambar* spp.\*  
 Sword fern\* *Nephrolepis* spp.\*  
 Sycamore\* *Platanus* spp.\*  
 Tecomaria *Tecomaria* spp.  
 Tipu Tree\* *Tipuana* spp.\*  
 Toyon\* *Heteromeles* spp.\*  
 Trachelospermum\* *Trachelospermum* spp.\*  
 Tree tobacco\* *Nicotiana* spp.\*  
 Tristania\* *Tristania* spp.\*  
 Trumpet creeper\* *Campsis* spp.\*  
 Trumpet Tree\* *Tabebuia* spp.\*  
 Tulbaghia\* *Tulbaghia* spp.\*  
 Tulip tree\* *Liriodendron* spp.\*  
 Tupelo *Nyssa* spp.  
 Tupidanthus\* *Tupidanthus* spp.\*  
 Umbrella wort\* *Mirabilis* spp.\*  
 Umbrella tree\* *Schefflera* spp.\*  
 Viburnum\* *Viburnum* spp.\*  
 Vigna *Vigna* spp.

Violet\* Viola spp.\*  
Walnut Juglans spp.  
Wild bergamot Monarda spp.  
Willow myrtle\* Agonis spp.\*  
Willow\* Salix spp.\*

Wisteria\* Wisteria spp.\*  
Xylosma\* Xylosma spp.\*  
Yellow jessamine\* Gelsemium spp.\*  
Yucca Yucca spp.  
Zea Zea spp.

## **APPENDIX B**

Urban areas to be grid surveyed shall be gridded by lines drawn  $\frac{1}{2}$  mile apart so that each square mile is divided into four parts. Each of these is further divided into four squares, which are  $\frac{1}{4}$  mile on each side or  $\frac{1}{16}$  of a square mile in area. Each of the 16 squares is called a superblock.

During the first year GWSS visual surveys should be initiated in four (4) superblocks in each square mile. Select (positionally) the same superblock in each block of four. In successive years inspection of superblocks should be rotated clockwise thus completing the superblocks within a quarter mile section Every four years (See Figure 1)

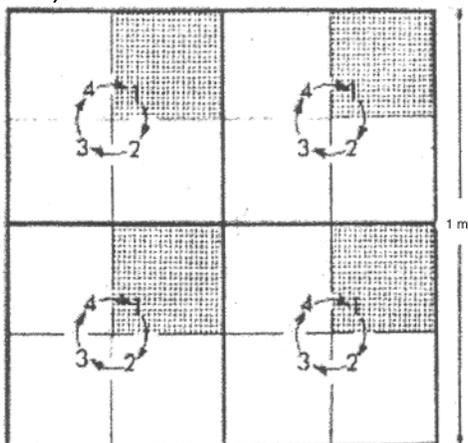


Figure 1 – Grid overlay for one square mile of urban area. Rotation on a four-year basis is indicated by numbers 1-4. Superblocks are indicated by shaded area.

Within each superblock the survey team should select 4 locations. Ideally these locations should be on different city blocks (See Figure 2). Properties which appear to have been recently landscaped potentially represent the greatest risk for introduction and should be given priority Biological bias should be used when determining which properties to survey (ie., those with multiple preferred hosts should be given preference). All GWSS hosts on each selected property should be inspected the Presence of sharpshooters.

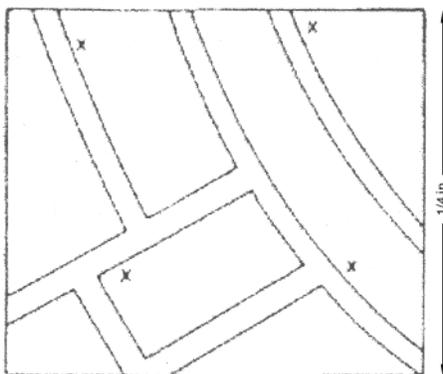


Figure 2- Urban Grid [X= inspection points within superblock].

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX I**

**GLASSY-WINGED SHARPSHOOTER  
NURSERY SHIPPING PROTOCOL**

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# Glassy-winged Sharpshooter Nursery Shipping Protocol

March 23, 2001

These protocols are provided to clarify the responsibilities and procedures to be followed by County Agricultural Commissioners in order to certify glassy-winged sharpshooter-free nursery stock destined to non-infested areas of California. These procedures are derived from the Pierce's Disease Control Program Regulations (formerly known as the Emergency Regulations) and the Master Permit (QC 922), including the associated Compliance Agreements and their exhibits.

## 1. Nursery Evaluation by CAC

County Agricultural Commissioners (CAC) monitor the visual survey and trapping activities of nurseries for the presence of glassy-winged sharpshooters (GWSS) to determine if a nursery in the infested area is eligible to ship nursery stock to non-infested areas of California under:

- A. The Pierce's Disease Control Program Regulations or,
- B. The Master Permit (QC 922) or,
- C. A combination of the Pierce's Disease Control Program Regulations and the Master Permit.
- D. Qualifying nurseries shall sign a compliance agreement under the regulations or master permit or both.
- E. Or, based on monitoring, CAC determines that a nursery is unable to qualify to ship nursery stock under A, B. or C to non-infested areas because of continuous pest pressure.

## 2. Shipping Under Pierce's Disease Control Program Regulations

For those nurseries qualified to ship nursery stock using the Pierce's Disease Control Program Regulations, which are the most stringent standards, the shipments shall be accompanied by a certificate, which affirms that the shipment meets one of the following three conditions (A, B. or C):

- A. Apply an Approved Treatment (approval pending field trials) to all plants submitted for certification prior to shipping.
- B. Ship plants originating from a non-infested (GWSS-free) premise or a non-infested (GWSS-free) portion of a premise. The non-infested (GWSS-free) premise shall be determined by:
  - (1) Visual survey
  - (2) Trapping

### **(CAC are expected to monitor all of the above nursery activities.)**

***Definition:** A non-infested (GWSS-free) premise or portion of a premise is defined as a non-infested nursery or portion of a non-infested nursery. A GWSS-free premise must be free of GWSS (viable) egg masses, live nymphs, and with no more than three adults found in the same ½ acre in a two-week period.*

- C. For five plants or less, a 100% inspection by the CAC. These plants shall be safeguarded from infestation by GWSS until shipped.
- D. For those destination counties enforcing restrictions the nurseryman must provide a Shipping Permit (Blue Tag) for each shipment destined there.

### 3. Shipping Under the Master Permit (QC 922)

For those nurseries qualified to ship under the Master Permit, all of the following conditions must be met:

- A. A GWSS-free staging area (shipment loading area) is trapped to ensure the area is GWSS-free. Either the nursery or the CAC may place and service GWSS yellow sticky panel traps within the staging area; however, it is the responsibility of the CAC to monitor this activity to ensure a GWSS-free staging area.
- B. The nursery shall submit GWSS-free plants for inspection.
- C. The CAC conducts a 100% inspection of all host plants at the GWSS-free staging area or nursery personnel conduct 100% inspection of host material under the direction of and in the presence of the CAC at the GWSS-free staging area.
- D. If the CAC finds an apparently viable GWSS life stage on a particular kind\* of plant (e.g. crepe myrtle), the infested plant(s) shall be returned to the growing grounds. CAC shall submit a sample of the GWSS for confirmation to the Plant Pest Diagnostics Center (PPDC). If GWSS is confirmed, action shall be taken by the nursery to mitigate the pest risk. The CAC shall make every effort to identify the growing locations of the different kind(s) of plants, which should be rejected on the basis of a find. This allows the CAC at origin the flexibility to make decisions based on pest risk assessment regarding the nursery stock and its location within the nursery grounds.
- E. Once the plants are inspected by the CAC and found free of GWSS life stages, the nurseryman shall apply a treatment to safeguard plants from infestation prior to shipment. The treatment shall be effective against adult and nymphal stages of GWSS. (Refer to Pesticides for Use).
- F. CAC issues a Certificate of Quarantine Compliance (CQC) or other approved certificate for each shipment destined to a non-infested area. The treatment shall be witnessed by CAC as necessary. The nursery shall indicate the time, date, and material used on the CQC. (CAC witnessing of treatment may be reduced to monitoring level after nursery develops adequate treatment protocols and procedures.)
- G. The nurseryman inspects the shipping vehicle for the presence of GWSS prior to the loading of plants. The vehicle's doors shall remain closed or some other method used approved by the CAC, except when plants are being loaded, to prevent the entry of GWSS adults after inspection.
- H. The nurseryman provides a Shipping Permit (Blue Tag) for each shipment destined to counties requiring such notice.

### 4. Destination Inspection

*Note: Inspection of arriving nursery stock shipments at destination is at the discretion of and conducted by the destination CAC.*

- A. When a nursery stock shipment arrives at a nursery, verification of the paperwork is essential.
  - (1) Check to see if a CQC or other approved certificate is present and, if necessary, a blue tag.

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\* The word "kind" in this context refers to a particular species of plant and not to its variety or genus. This will apply throughout this document.

- (2) If neither is present and the shipment is from a partially infested county, check to see if the shipping nursery is located outside of the infested area. If it is, then neither a CQC nor blue tag is required. If it is from an infested area, the county at destination should call the origin county to inquire about the shipment paperwork, otherwise reject the shipment (return to origin); it does not meet requirements.
- B. If live GWSS adults are found in the truck, the truck should be closed and the entire shipment should be rejected and returned to origin.
  - (1) If the shipment was a multiple county drop, notify the other CAC's.
  - (2) If live adults fly into the nursery from the shipment, then see below.
- C. If live nymphs are found while inspecting an off-loaded nursery stock shipment, the following should be done:
  - (1) Collect as many of the nymphs or adults as possible from the shipment and submit the sample to CDFA's PPDC for confirmation.
  - (2) Isolate the shipment and immediately apply a chemical treatment (see #6) to all the plant material in the shipment. The treatment must be effective against adult and nymphal stages of GWSS.
  - (3) Reject and return the entire shipment to origin.
- D. If during the inspection of an incoming nursery stock shipment an apparently viable egg mass of GWSS is found, the following should be done:
  - (1) Finish inspecting the entire shipment.
  - (2) Secure suspect GWSS sample(s) from the shipment and submit to the CDFA's PPDC for confirmation.
  - (3) Put the particular kind of plant on hold (off-sale to the public) and safeguard until the sample is confirmed.
  - (4) If the PPDC determines the sample is a non-viable egg mass, then release the particular kind of plant.

*Note: Only shipments with PPDC confirmed viable GWSS life stages should be rejected (treated, returned, or destroyed.) It has been determined that fresh parasitized egg masses will be determined to be "viable " due to the fact that not all eggs may be parasitized.*

- (5) If the sample is a viable egg mass, then the following options are available:
  - a) The host material is rejected.
  - b) Host material is returned to origin.
  - c) Host material is destroyed at destination.
  - d) GWSS host material is held and treated (if CAC feels the pest risk can be Mitigated).
    - (i) Chemically treat until GWSS pest risk is eliminated which is determined by the CAC.
    - (ii) Removal of all leaves (defoliate) to remove egg masses with disposal in a manner, which renders all life stages nonviable.
- E. If one or more adult GWSS or nymph are found in a nursery and the find can be directly linked to a recent shipment, then:
  - (1) Notify GWSS program
  - (2) Notify origin CAC
  - (3) Notify origin nursery

**5. Follow-Up by Origin CAC** when a confirmed life stage of GWSS is found at destination.

- A. If the nursery is operating under the non-infested (GWSS-free) premise of the Pierce's Disease Control Program regulations, the nursery will immediately discontinue shipments that include the affected kind of plant(s) and will treat those kinds of plants to eliminate GWSS from within the nursery.

- B. The nursery or portion of may no longer be "non-infested" (GWSS-free) and the CAC shall review and assess this status in accordance with Pierce's Disease Control Program regulations.
  - (1) Remove host species from shipping list if species can be directly linked to find
  - (2) Check nursery trap and treatment records.
  - (3) Mitigate pest problem(s):
    - a. Survey origin nursery and growing grounds, if separate
    - b. Chemical treatment(s)
    - c. Re-survey after treatment(s)
- C. The CAC shall review and assess non-infested (GWSS-free) staging area in accordance with the Master Permit requirements.
- D. The CAC shall record a strike for that kind (species) of plant whether the nursery is operating under the Master Permit or Program Regulations. (For finds at destination only.)
- E. When three confirmed life stages are found on a specific kind of plant at destination (within a three month period), the nursery at origin must immediately suspend shipments for that kind of plant and two chemical treatments will be made with a recommended material over a two-week period. The pest problem shall be mitigated to the satisfaction of the origin CAC before shipments are allowed to resume. All information regarding suspensions of shipping privileges or specific plant species shall be put on the bulletin board by the origin CAC of the GWSS web site. Information regarding the lifting of suspensions shall also be indicated on the bulletin board at the time they occur.

**6. Pesticides For Use Against Glassy-winged Sharpshooter**

- A. The California Department of Food and Agriculture (CDFA) is in the process of evaluating a number of pesticides for use against the glassy-winged sharpshooter. When these tests are completed, regulatory officials will use the results as a basis for any materials approved as quarantine treatments for use against GWSS. Materials are also being screened for use on organic crops. Until then, *Fenpropathrin* and *Imidacloprid* (as a foliar application) are recommended for use on nursery stock moving out of the infested area based on laboratory efficacy studies. CDFA suggests the following general categories of chemicals for use by nurseries to control/suppress GWSS:

Acephate	Bifenthrin	Carbaryl	Chlorpyrifos
Cyfluthrin	Deltamethrin	<i>Fenpropathrin</i>	<i>Imidacloprid</i>
Methiocarb	Permethrin		

- B. The criteria for pesticide selection by an individual grower or nursery will be dependent on their specific circumstances of harvest, worker re-entry, and/or shipment. A qualified pesticide advisor should make specific product recommendations. Pesticides should be used according to EPA registration and label directions.

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX J**

**GUIDELINES FOR THE REGULATORY EVALUATION OF POTENTIAL  
BIOLOGICAL CONTROL AGENTS FOR INTRODUCTION INTO CALIFORNIA**

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# **GUIDELINES FOR THE REGULATORY EVALUATION OF POTENTIAL BIOLOGICAL CONTROL AGENTS FOR INTRODUCTION INTO CALIFORNIA**

The California Department of Food and Agriculture has the authority to control the importation and release of biological control agents into California under Section 6305 of the Food and Agricultural Code. Led by the Department's Biological Control Program, we have developed the following guidelines to evaluate whether to permit the importation and/or release of a biological control agent in the State. The guidelines are designed to encourage the continued use of such agents in California. They have provided effective, permanent control of a number of highly damaging exotic plant pests and weeds for over 100 years. The guidelines are also designed to provide a review to identify the potential benefits of the introduction of biological control agents into the State, an estimation of the likelihood of success, potential undesirable effects of the agents, and the likelihood of their occurrence. It then recommends that the possible benefits and undesirable consequences be balanced before a decision on whether to continue is made.

The Department believes the following:

- Biological control has proven to be an effective and permanent pest control technology in California for over 100 years.
- Biological control will continue to play an important role in pest control for the foreseeable future in California.
- Not all pests are amenable to biological control and historical precedent can provide a useful indication of the potential success of future efforts.
- The potential of proposed biological control agents to attack non-target species related to the pest target species must be evaluated prior to approving release.
- In general, insect attacking parasitoids are more specific in their host range than generalist predators.
- Releasing a biological control agent simply because it eats a pest is not sufficient grounds for approving the release.
- In general, releases having little chance of success should not be permitted.
- We accept that gaps will exist in our knowledge about a proposed biological control agent. The existence of the gaps is not in and of itself grounds to deny a permit.

Regulatory decisions are, by their nature, time driven events. Regulators make decisions based on the information available to them at the time such decisions must be made. We do not have the luxury of waiting for more research to be done so that a "perfect" decision can be made.

## **DATA NEEDED TO MAKE A DECISION**

### HERBIVORES

1. What is known about the proposed biological control organism's taxonomy, biology, and life history.

2. Taxonomy and life history of the target pest plant and list of related plants in California.
3. Full host range tests conducted in accordance with the USDA Technical Advisory Group guidelines.
4. Tests on related California plants or other plants of concern found in California. Tests should include the ability of the stages that eat the pest plant to survive on the non-target plants, and ability of the agent to complete development and produce viable adults on the non-target plants. Should the proposed biological control agent eat the non-target plants, an analysis of the probability of the agents finding the non-target plants needs to be done.
5. Provide the host plant range of species closely related to the proposed biological control agent.

### PREDATORS

1. What is known about the proposed biological control organism's taxonomy, biology and life history.
2. Taxonomy and life history of the target pest animal and list of related animals in California.
3. Tests on related California animals or other animals of concern found in California. Tests should include the ability of the stages that eat the pest to survive on the non-target animal, and ability of the agent to complete development and produce viable adults on the non-target organisms. Should the proposed biological control agent eat the non-target animals, an analysis of the probability of the agents finding the non-target animals needs to be done.
4. Provide the host range of species closely related to the proposed biological control agent.

### PARASITOIDS

1. What is known about the proposed biological control organism's taxonomy, biology and life history.
2. Taxonomy and life history of the target pest animal and list of related animals in California.
3. Tests on related California animals or other animals of concern found in California. Tests should determine the ability of the agent to complete development and produce viable adults on the non-target organisms. Should the proposed biological control agent eat the non-target animals, an analysis of the probability of the agents finding the non-target animals needs to be done.
4. Provide the host range of species closely related to the proposed biological control agent.

## PATHOGENS

1. What is known about the proposed biological control organism's taxonomy, biology and life history.
2. Taxonomy and life history of the target pest plant/animal and list of related plants/animals in California.
3. Tests on related California plants/animals or other plants/animals of concern found in California. Tests should determine the ability of the agent to complete development and reproduce on the non-target organisms. Should the proposed biological control agent successfully infect the non-target plants/ animals, an analysis of the probability of the agents finding the non-target plants/animals needs to be done.
4. Provide the host range of species closely related to the proposed biological control agent.

The appropriate Primary State professional, staff from the biological control program and any others deemed necessary by the appropriate Primary State professional will review the information. The review group will provide a written report that explains their recommendation on whether or not to support the permit request in question.

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX K**

**MEMORANDUM: PERMIT TO INTRODUCE GLASSY-WINGED  
SHARPSHOOTER PARASITIDS**

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## Memorandum

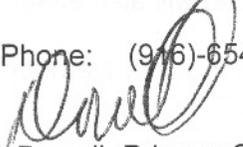
To: Barbara Haas, Special Assistant  
Plant Health and Pest Prevention Services

Date: April 30, 2001

Place: Sacramento

Phone: (916)-654-1211

From: **Department of Food and Agriculture**

  
Robert V. Dowell, Primary State Entomologist  
Pest Detection/Emergency Projects

Subject: Permit to Introduce Glassy-winged Sharpshooter Parasitoids

In early 2000, I was asked to review a permit for the importation and release of exotic parasitoids against the glassy-winged sharpshooter (GWSS). After consultation with Larry Bezark and available literature, I found the following:

- GWSS lays its eggs in an egg mass that is inserted under the epidermis of leaves.
- The parasitoids proposed for introduction attack the egg masses of the GWSS.
- Some of the parasitoids proposed for introduction are already in California, but others are not. It is possible that those parasitoids already in California are native species well adapted to our climate.
- There are parasitoids in California already attacking the egg masses of GWSS, but the rate of attack of these parasitoids already in California on the first GWSS generation is very low. The rate of attack of the parasitoids already in California can exceed 80% in the second GWSS generation, but there are no data with which to determine if this is reducing GWSS numbers to a manageable level.
- The parasitoids already present in California also attack the egg masses of the related smoke tree sharpshooter at rates up to 80+%. It is very likely that the parasitoids proposed for introduction would also attack the egg masses of the smoke tree sharpshooter. The smoke tree sharpshooter is also a vector of Pierce's disease.
- There are other native sharpshooters that lay their eggs in masses inserted under the epidermis of leaves. It was considered likely that the parasitoids proposed for introduction would also attack the egg masses of these other native sharpshooters. The parasitoids already present in California also attack the egg masses of the other native sharpshooter at unknown rates. Most of these native sharpshooters are vectors of Pierce's disease.
- No native leafhopper is considered a threatened or endangered species, or a species of concern.

- The primary goal of the introduction of exotic parasitoids is to increase the rate of parasitization of the egg masses of the first GWSS generation. It is very likely that any parasitoid introduced will also attack the egg masses of the second GWSS generation.
- The parasitoids that attack leafhopper egg masses are not known to attack the eggs of other taxa of insects.

Based on this information and my professional judgment, I recommended that the permit to introduce exotic parasitoids of the GWSS be approved. I concluded that:

- It was likely that one or more of the exotic parasitoids would become established in California.
- It was reasonable to assume that these newly established parasitoids would attack GWSS egg masses and the egg masses of native sharpshooters. It was reasonable to assume that the additional mortality imposed by these parasitoids on native sharpshooters would lower their numbers, but this is not a certainty.
- There is a reasonable possibility that one or more exotic parasitoids will be introduced, which will impose significant mortality on the egg masses of the first GWSS generation.

On balance, I found that the potential reduction in numbers of the native leafhoppers, which are also Pierce's disease vectors, was not a sufficiently negative side effect to warrant not recommending approval of the permit to introduce exotic parasitoids of the GWSS.

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX L**

**MEMORANDA OF UNDERSTANDING BETWEEN**

**THE CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE AND THE  
CALIFORNIA DEPARTMENT OF FISH AND GAME**

**AND**

**THE CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE AND THE  
UNITED STATES FISH AND WILDLIFE SERVICE**

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State of California

## Memorandum

To: Mr. Henry Voss, Director  
California Department of Food and Agriculture  
1220 North Street  
Sacramento, California 95814

Date: January 23, 1992

From: Department of Fish and Game

Subject: Memorandum of Understanding (MOU) between California Department of Food and Agriculture (CDFA) and the Department of Fish and Game (DFG) Regarding California Endangered Species Act (CESA) Consultation

The DFG concurs, by way of signature, with the terms and conditions specified in the attached MOU regarding CESA consultation exotic pest eradication projects. We share your belief that this MOU is a significant step toward highly desirable environmental coordination between our two departments, and we believe that the MOU will provide the framework for more efficient and effective protection and enhancement of fish and wildlife resources potentially impacted by future emergency exotic pest eradication projects.

We appreciate the spirit of cooperation extended by CDFA staff during the formulation of this MOU. We hope to work closely with CDFA in a well coordinated effort to identify potential environmental impacts in a timely manner; to minimize these impacts and to implement a procedure for compensation of unavoidable impacts well in advance of the actual generation of such impacts.

O/S  
Boyd Gibbons  
Director

Attachment

MEMORANDUM OF UNDERSTANDING  
BETWEEN THE  
CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE  
AND THE  
CALIFORNIA DEPARTMENT OF FISH AND GAME

Both the California Department of Fish and Game and the Department of Food and Agriculture recognize that preventing the establishment of exotic pest species is essential to the preservation and enhancement of California's environment. Exotic pest species pose a significant threat to the state's native species in general and threatened and endangered species in particular. While exotic pest exclusion is the primary mechanism for preventing the establishment of exotic pest species, it is also necessary on occasion to eradicate incipient infestations of these pests.

A. PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to establish procedures for endangered and threatened species consultation between the California Department of Food and Agriculture, hereinafter referred to as CDFA, and the California Department of Fish and Game, hereinafter referred to as DFG. This MOU is intended to ensure that exotic pest eradication projects are planned, designed, and conducted so that fish and wildlife resources are protected in conformance with the California Endangered Species Act (CESA).

Under CDFA Code Sections 5761-5764 (Chapter 8, Article 4) and Section 3591 of Title 3 of the California Code of Regulation, Section 407, 5001, et seq., the Director of the CDFA has the authority to conduct eradication programs for exotic pests that pose a significant threat to California's agriculture and environment. Such programs have been successfully conducted against the boll weevil, Caribbean fruit fly, guava fruit fly, gypsy moth, Japanese beetle, Mediterranean fruit fly, melon fly, Mexican fruit fly, Oriental fruit fly, and peach fruit fly in recent years. All of these programs have involved the use of synthetic organic pesticides, and therefore pose some potential risk to endangered, threatened, or candidate species in California, through either direct total effects, or indirect effects such as reducing their food supply or pollinators. It is the goal of CDFA and DFG that pest eradication programs be carried out in such a manner as to avoid significant adverse effects on endangered, threatened, or candidate species.

B. IN EFFECTING THIS UNDERSTANDING:

1. CDFA will:

- a. Develop the following information about its exotic pest eradication programs for a specific pest, or group of pests, to be used in early (informal) consultations at a statewide level to determine the compatibility of the available, effective exotic pest eradication tactics with threatened and endangered species: 1) information on how CDFA selects the tactics to be used in the eradication program; 2) description of each tactic including its limitations, rate of application for any pesticides; 3) for each tactic, data on its effects on non-target organisms including sub-lethal pesticide effects, environmental fate, and stability; and 4) any CDFA environmental monitoring data from previous eradication programs using the same tactics.

- b. Send to the appropriate DFG regional office a written request for informal consultation. Provide information to each DFG regional office for their review. CDFA staff will then conduct early (informal) consultations with DFG staff in each regional office to determine the compatibility of each tactic with threatened and endangered species in their area. The result of these early consultations will be a table showing the consensus of the compatibility of each tactic with threatened, endangered, and candidate species in the state. CDFA shall also make this information available to DFG Environmental Services Division at DFG Headquarters in Sacramento.
- c. Use these tables in a variety of documents including action plans, work plans, and environmental documents as a planning tool for site-specific eradication programs to select tactics which are compatible with threatened, endangered, and candidate species in the proposed treatment area. CDFA policy is to avoid, if possible, any eradication treatments or tactics adverse to any threatened, endangered, or candidate species in an exotic pest eradication program.
- d. Request input from DFG regional offices, on any California environmental quality act document pertaining to exotic pest eradication, to evaluate the species specific compatibilities of eradication tactics with threatened or endangered species as shown in the table.
- e. Initiate a site-specific early (informal) consultation as it develops actual emergency eradication programs. This will include:
  1. Appropriate CDFA staff in the Pest Detection/Emergency Projects Branch (PD/EP) and Control and Eradication Branch (CE) shall call the DFG Regional Manager, or delegated contact person in the region responsible for the area in which the eradication program will be conducted to alert him/her about the proposed actions. The information listed below shall then be transmitted via facsimile machine to the DFG Regional Manager for review with a copy sent to DFG Environmental Services Division. This initial telephone call will also be used to negotiate the date by which DFG staff must have completed their review and responded to CDFA.
  2. An outline map showing the boundaries of the project area.
  3. A full map of the project area with boundaries.
  4. A copy of the Proclamation of Eradication Project (PEP), or its equivalent, issued by the Director of CDFA.  
  
The PEP describes the conditions which led the Director of CDFA to conclude that an isolated infestation of the pest does exist in California, the options available to deal with the infestation and the option (s) selected to eradicate the infestation.
  5. Additional information as necessary on rates of any pesticide application, timing of pesticide or non-pesticidal treatments, and effects of any treatments on non-target organisms, to enable DFG staff to conduct their reviews of the eradication program.
  6. The results of CDFA review of DFG Natural Diversity Data Base (NDDB) records

for endangered, threatened, or candidate organisms previously reported inside or close to the project boundaries. To facilitate this review, CDFA shall contract with DFG NDDDB annually to provide maps and printouts containing this information.

7. CDFA shall provide to DFG the best scientific information available at that time, including the results of the plant and animal surveys, previous biological assessments, or any other information available on listed species in the proposed project area, on which to base its determination pursuant to Section 2090 of the Fish and Game Code.
  8. If any endangered, threatened, or candidate species are inside or in close proximity to the project boundaries, CDFA shall also provide site specific information or the table in B-1-b for DFG staff review.
  9. CDFA will also informally consult with the United States Fish and Wildlife Service (USFWS) concerning the potential effects of its eradication program on federally listed endangered or threatened species. CDFA shall provide DFG the results of these consultations.
2. DFG will:
- a. Review the above listed materials and in emergency cases respond to CDFA staff with a preliminary opinion by the date agreed upon in the initial telephone call to the DFG Regional Manager. This preliminary opinion may be verbal, with a written follow-up, or in writing. A copy of the written preliminary emergency CESA Biological Opinion shall be sent to DFG Environmental Services Division.
  - b. Contact by telephone, with written follow-up, the appropriate CDFA staff, and jointly develop the necessary measures and conditions to avoid jeopardy if DFG staff feel that any actions to be taken by CDFA and DFG that initial approval of an eradication project does not preclude requiring avoidance measures if supplemental information acquired at a later date necessitates altering the initial project. CDFA shall provide to the DFG the best available information, as required by CESA, in order to base a preliminary opinion.
  - c. Respond to CDFA requests within 45 days, except when in the case of 2a. and 2b. above, or when necessitated by pest biology. It is understood that CDFA shall request an emergency early consultation only in an emergency as defined in the Public Resources Code Section 21060.3, or as proclaimed by the Governor, or as necessitated by pest biology. "Emergency" means a sudden, unexpected occurrence, involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services.
  - d. Will arrange for staff from each regional office to meet annually with the CDFA staff scientist responsible for endangered, threatened, and candidate species during eradication projects for the purpose of reviewing potential future CDFA projects, and discussing the resolution of potential effects on endangered or threatened species. At these meetings, DFG will provide information on efforts to recover endangered and threatened species of concern. DFG will also provide information on any candidate species that may be adversely impacted by CDFA activities.

3. If CDFA has not concluded the statewide early (informal) consultation due to the discovery of an unforeseen exotic pest, it shall only do the site-specific consultation, but will endeavor to provide all the information delineated for both consultants.
4. If DFG staff conclude that CDFA exotic pest eradication activities pose potential jeopardy to threatened, endangered, or candidate species, and if measures to avoid jeopardy cannot be agreed upon during early (informal) consultations, CDFA shall then enter into formal consultation with DFG.
5. For formal consultation CDFA shall:
  - a. Send a written request to the Director of DFG pursuant to Section 2090 of the Fish and Game Code to initiate the process.
  - b. Provide all the information necessary to adequately evaluate whether the proposed project will jeopardize any state-designated endangered, threatened, or candidate species. This information shall meet the guidelines set forth in Appendix II of the California Endangered Species Act Consultation Guidelines, but may also include other information as requested in writing by DFG staff.
6. For formal consideration DFG will:
  - a. The appropriate regional and Division staff shall review the materials provided by CDFA and conduct meetings, site visits, conversations, etc., as needed.
  - b. The region shall provide, for the DFG Director's signature, a written CESA Biological Opinion to CDFA, including findings as to whether or not the proposed project is likely to jeopardize any state listed species.

This MOU will become effective when approved by the CDFA Director and the DFG Director, and shall continue in force and effect until terminated by either party. This MOU may be amended by mutual consent of the signatory parties.

O/S  
Robert L. Shuler  
Director  
California Department of Food and Agriculture  
1/17/92

O/S  
Howard A. Sarasahn for  
Director  
California Department of Fish and Game  
1/23/92

Information Required to Determine Whether a Proposed Project  
Could Jeopardize Endangered and Threatened Species

- 3000. The Department of Fish and Game needs detailed information in order to fully and accurately determine the effects of a proposed project on endangered and threatened species. Although there is no required format, the following data must be clearly presented:
  - 3000.1 A full description of the project area and project impact area, including maps.
  - 3000.2 Known and potential distribution of endangered and threatened species in the project area and project impact area, based on recent field surveys.
  - 3000.3 Additional information on species distribution and habitat, based upon literature, and scientific data review, and discussions with experts.
  - 3000.4 Analysis of possible effects of the proposed project on listed species, including cumulative effects.
  - 3000.5 Analysis of alternatives designed to reduce or eliminate impacts to endangered and threatened species.
- 3010 To resolve potential conflicts as early as possible, state agencies are strongly encouraged to provide the above information to DFG during the Initial Study/Preliminary Review (or comparable) stage.

## **Memorandum of Understanding**

This is a Memorandum of Understanding between the California Department of Food and Agriculture (CDFA) and the Laguna Niguel office of the United States Fish and Wildlife Service (USFWS) concerning the informal consultation of CDFA with USFWS about possible negative impacts of CDFA pest eradication programs on endangered and threatened species, and migratory birds in California.

Under California Food and Agricultural Code Sections 5761-5764, Chapter 8, Article 4, and Section 3591 of Title 3 of the California Code of Regulations, Section 407, 5001, et. seq., the Director of CDFA has the authority to conduct eradication programs aimed at pests that pose a threat to California's agriculture and environment. Such programs have been successfully conducted against the boll weevil, Caribbean fruit fly, guava fruit fly, gypsy moth, Japanese beetle, Mediterranean fruit fly, melon fly, Mexican fruit fly, Oriental fruit fly, and peach fruit fly in recent years. All of these programs have involved the use of synthetic organic pesticides, and therefore pose some potential risk to endangered or threatened species, or migratory birds in California, through either direct effects such as killing them, or indirect effects such as reducing their food supply or pollinators, if applied to areas such as organisms. Since it is the policy of CDFA to conduct its pest eradication programs in such a manner as to not have any significant adverse effects on endangered or threatened species, or migratory birds, we believe that close informal consultations with USFWS staff are essential.

To this end, the CDFA agrees to provide to appropriate USFWS field offices the following material for review, prior to the application of any pesticides in any eradication program conducted by CDFA.

1. An outline map showing the boundaries of the project area.
2. A full map of the project area with boundaries.
3. A copy of the Proclamation of Eradication Project (PEP) issued by the Director of CDFA.

The PEP describes the conditions which led the Director of CDFA to conclude that an isolated infestation of the pest does exist in California, the options available to deal with the infestation, and the option (s) selected to eradicate the infestation.

4. Additional information as necessary on rates of pesticide application, timing of these treatments, effects of these treatments on non-target organisms, etc., as required by USFWS staff to conduct their reviews of the eradication program.
5. The results of CDFA review of California Department of Fish and Game Natural Diversity Data Base (NDDDB) records for endangered or threatened organisms previously reported inside or in close proximity to the project boundaries. To facilitate this review CDFA shall contract annually with CDFG NDDDB to provide maps and printouts containing this information.
6. If any endangered or threatened species, or migratory birds are inside or in close proximity to the project boundaries, CDFA shall also provide proposed avoidance measures for USFWS staff review.
7. As CDFA will also be in informal consultation with the CDFG concerning the potential effects of its eradication program on state listed endangered or threatened species, or migratory birds CDFA shall provide USFWS the results of these informal consultations.

Appropriate CDFA staff in the Pest Detection/Emergency Projects Branch (PD/EP) shall call the USFWS designated contact responsible for the area in which the eradication program will be conducted, to alert him/her about our proposed actions. The above listed information shall then be transmitted via facsimile machine to the USFWS designated contact for review. The initial phone call will also be used to negotiate the date by which USFWS staff must have completed their review and responded to CDFA.

The USFWS agrees to review the above listed materials and to respond to CDFA's PD/EP staff by the date agreed upon in the initial phone call to their designated contract. This response may be verbal, with a written follow-up, or in writing, and shall range from no comment to a complete avoidance recommendation. If USFWS staff feel that any actions to be taken by

CDFAs pose a significant risk to endangered or threatened species, they shall phone the appropriate CDFAs staff in PD/EP Branch and develop the necessary avoidance measures.

It is understood by both CDFAs and USFWS that initial approval of an eradication project does not preclude further information being acquired at a later date which may necessitate altering the initial project to include further avoidance measures.

The typical response period required of USFWS by CDFAs for emergency projects will be from three to seven days. CDFAs shall only request such short review periods when necessitated by pest biology. CDFAs recognize that these extremely short response times will put a severe burden on USFWS staff. The CDFAs deeply appreciate the willingness of USFWS to help meet both of our goals: the eradication of the invading exotic pest, and the preservation of endangered and threatened species, and migratory birds.

O/S  
Don Henry  
Chief  
Pest Detection/Emergency Projects Branch  
3-18-91

O/S  
Brooks Harper  
Office Supervisor, Laguna Niguel Office  
United States Fish and Wildlife Service  
3-12-91



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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX M**

**PRODUCT LABELS AND MATERIAL SAFETY DATA SHEETS  
FOR PESTICIDES USED MOST OFTEN IN THE EMERGENCY PROGRAM**

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX N**

**LETTERS BETWEEN THE NATIONAL MARINE FISHERIES SERVICE (NMFS)  
AND U. S. DEPARTMENT OF AGRICULTURE (USDA)  
CONCERNING THE DETERMINATION THAT THE PDCP IS NOT LIKELY TO  
ADVERSELY AFFECT SALMONID SPECIES LISTED UNDER THE  
ENDANGERED SPECIES ACT**

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UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Southwest Region  
501 West Ocean Boulevard, Suite 4200  
Long Beach, California 90802-4213  
TEL (310) 980-4000; FAX (310) 980-4018

March 26, 2001

In Response Refer To:  
151422SWR01SR292-JJD

Mr. Vernon Harrington  
United States Department of Agriculture  
Animal Plant Health Inspection Service - PPQ  
Western Regional Office  
9580 Micron Avenue, Suite I  
Sacramento, California 95827

Dear Mr. Harrington,

This responds to your request of February 2, 2001 for concurrence with your determination that the United States Department of Agriculture's (USDA) funding support of the California Pierce's Disease (PD) Control Program is not likely to adversely affect salmonid species listed under the Endangered Species Act.

In August 2000, the USDA transferred \$22.3 million to support the Pierce's Disease Control Program. A large portion of this program is centered around the control of the glassy-winged sharpshooter (GWSS), a invasive vector of the grapevine disease, whose presence in California is growing. The GWSS is also capable of vectoring similar diseases in other agricultural crops such as almonds, alfalfa, peach, and citrus. They are a vector in the spread of oleander leaf scorch, a disease that affects this prominent landscaping plant that is used in divided highway barriers throughout the state.

The primary purpose of the federal grant was to assist the California Department of Food and Agriculture (CDFA) in conducting survey activities for the GWSS. There are surveys not only of properties which are conducted largely in response to public identification of the GWSS, but also surveys of nursery stock, bulk grape and citrus shipments. The surveys accounted for \$14.6 million of the funding, while research projects focusing on the disease and GWSS biology and control were allotted \$5.3 million. The remaining \$2.4 million was used by USDA-APHIS (Animal and Plant Health Inspection Service) for internal research projects and direct costs related to the program. Continued federal funding for the PD Control Program is expected and has been proposed as a line-item program by USDA. The State is requesting \$5.3 million annually to continue research programs.

The USDA funding not only provides for research and the survey activities which detect the GWSS, but it also allows the state to reserve its appropriated funding for treatment activities. Some insecticide applications are directly made or paid for by USDA in research projects funded through this grant.



A prominent feature of the State of California's PD program are rapid response plans for GWSS control. The State requires each county agricultural commissioner to prepare a rapid response plan should the insect be discovered in their county. These plans are approved by the County Directors and the State. Without such a plan, the county is not eligible for reimbursement of survey or treatment expenses.

The chemical most often used in these rapid response treatments is carbaryl, a carbamate insecticide that is common in numerous household and garden insecticide products. The brand used by the State in this program is Sevin®, which has several formulations that may vary slightly. Formulations of Sevin® have been used in the past by the State in control and eradication programs for gypsy-moth (1982-1983) and Japanese beetle (1983-1986). It has been successfully used without incidents of toxicity in surface waters during these programs.

The NMFS first contacted USDA-APHIS about the federal grant in August 2000 in response to numerous newspaper articles and public inquiries about the GWSS and the possibility of aerial insecticide treatments of infested urban areas. USDA-APHIS set up a meeting between staff from CDFA and NMFS to explain the control program and to answer NMFS questions. This meeting on September 19, 2000 proved to be very constructive and informative and served to alleviate many of our concerns.

The CDFA stressed at the meeting, as USDA-APHIS does in its consultation letter, that this program is designed to control the spread of the GWSS and thus Pierce's Disease. It is not an eradication program. It is highly unlikely that eradication of the GWSS could ever be accomplished. The insect is well established in the southern portion of the state. The difference between a control program and an eradication program can be significant for wildlife and habitat. The presence of threatened or endangered species, whether listed by federal or state authorities, or sensitive habitat (including designated critical habitat for NMFS species) is enough to alter the treatment regime so that take of the species, or adverse modification of designated critical habitat does not occur.

It was made clear to NMFS representatives that nontreatment of an infested area was a viable option in the program if the treatment could not be applied without exposing salmonids. Treatment plans need to be designed to insure that exposure will not occur. For example, this could mean that a section of riparian area is only treated partially (e.g. no insecticides sprayed on trees above a certain height level to insure that there is not any airborne drift into the associated waterbody) or not treated at all.

The CDFA has retained effective control over the program. A communication process has been put into place that keeps NMFS aware of pest outbreaks and planned treatments. NMFS staff is able to provide input into the program for each individual incident to insure that there is not any take of NMFS trust resources. Joe Dillon in the Santa Rosa office serves as NMFS contact. The format of this coordination program is based upon MOUs signed with the California Department of Fish and Game (CDFG) and the United States Fish and Wildlife Service (USFWS) in 1991 and 1992 to address control and eradication programs for exotic pest outbreaks.

The CDFA has contracted with the California Department of Pesticide Regulation (CDPR) to monitor applications of insecticides related to this program. The CDPR samples the concentration of the insecticide in the spray tank, in nearby surface waters, in the air and on treated foliage before and after application. Surface water sampling is often conducted again following the first rain or irrigation event post-treatment. Drains, streams and ponds are routinely tested. Other water bodies, such as swimming pools, small fish ponds, etc are often tarped to prevent exposure. This also insures that if they are drained following the application, it will not result in exposure of salmonids to the insecticides.

At this time NMFS is not aware of any episodes of toxicity that have come out of the current treatment program. Only one application in Contra Costa County resulted in subsequent concentrations in surface water that may have been harmful to salmonids and their habitat had they been exposed. This sample was taken from a street drain that subsequently flowed to a retention pond. There was not a salmonid-bearing water body release associated with the treatment and salmonids were not exposed.

The NMFS feels that it is very important to control the spread of the GWSS which will concurrently minimize the harm of PD to vineyards and potential harm to the other crops mentioned earlier in this letter. It is a foregone conclusion that an outbreak of GWSS on private agricultural lands, particularly in riparian vineyards, will lead to an aggressive campaign of insecticide treatment by the local growers. The possibility of exposure and take will grow exponentially and neither NMFS nor the USDA has strict control over the insecticide or method of application chosen by a grower for their property. The grower is required to follow insecticide label directions only and these chemicals and application methods have not undergone consultation. There are numerous pesticides registered for use on grapes, almonds, peaches, etc. that are more toxic to salmonids and their prey base than carbaryl (or imidacloprid, a soil applied systemic insecticide that has been used in conjunction with carbaryl at some locations). Aerial applications are a registered, viable option for some of these other insecticides on private agricultural property. Truck or tractor based ground rigs may also be used by individuals in this setting. These application methods lead to the greater probability of exposure and take of salmonids.

There is significant acreage in the northern part of California planted in vineyards. Much of this area falls within watersheds designated as critical habitat for listed salmonids and vineyards are the primary land use along some prominent salmonid waterbodies such as the Russian and Napa rivers. Their presence is also growing in other watersheds such as the Navarro and Gualala rivers as well as within the Sacramento-San Joaquin Delta area. Listed salmonid Evolutionarily Significant Units (ESUs) found within the current and potential distribution are of the GWSS are:

ESU	Status	ESU Listing	Critical Habitat
<u>Steelhead trout</u> ( <i>O. mykiss</i> )			
Northern California	threatened	65 FR 36074, 7 Jun 00	Not yet designated
Central Valley	threatened	63 FR 13347, 19 Mar 98	65 FR 7764, 16 Feb 00
Central California Coast	threatened	62 FR 43937, 18 Aug 97	65 FR 7764, 16 Feb 00
South-Central California Coast	threatened	62 FR 43937, 18 Aug 97	65 FR 7764, 16 Feb 00
Southern California	endangered	62 FR 43937, 18 Aug 97	65 FR 7764, 16 Feb 00
<u>Coho salmon</u> ( <i>O. kisutch</i> )			
S. Oregon/N. California Coast	threatened	62 FR 24588, 6 May 97	64 FR 24049, 5 May 99
Central California Coast	threatened	61 FR 56138, 31 Oct 96	64 FR 24049, 5 May 99
<u>Chinook Salmon</u> ( <i>O. tshawytscha</i> )			
California Coastal	threatened	64 FR 50394, 16 Sep 99	65 FR 7764, 16 Feb 00
Sacramento River Winter-Run	endangered	59 FR 440, 4 Jan 94	58 FR 33212, 16 Jun 93
Central Valley Spring-Run	threatened	64 FR 50394, 16 Sep 99	65 FR 7764, 16 Feb 00

After careful review of consultation package provided by USDA-APHIS, NMFS concurs that California's Pierce's Disease Control Program, and the federal funding that makes it possible in its current form, is not likely to adversely affect salmonids protected the Endangered Species Act. This determination is based on the description of the proposed action, which specifies that:

1. The program is designed and conducted to control the spread of GWSS and will not escalate into an eradication effort. Take is not authorized for this program and will be likely to occur if the program's goal is changed to eradication of the GWSS. An eradication program would require formal consultation and take authorization.

2. Coordination and consultation procedures with NMFS on the pest detections and subsequent control actions continues to occur in the real time manner that they are occurring now to assure that no take occurs.
3. Environmental monitoring of applications by the CDPR continues to occur. This is a key control component in insuring that treatments are designed and applied in a manner that avoids exposure of salmonids and their habitat.
4. Insecticide applications are only made by certified pest control operators properly trained and outfitted for the task.

The CDFA has expressed interest in developing a MOU with NMFS concerning the PD Control Program and future exotic pest control efforts, similar to their MOUs with the USFWS and CDFG. NMFS is agreeable to opening this dialogue and looks forward to hearing from the CDFA in the upcoming months.

I concur with your determination that this project is not likely to adversely affect endangered and threatened salmonids or their designated critical habitat. Essential Fish Habitat is not likely to be adversely affected. This concludes consultation in accordance with 50 CFR §402.14(b)(1) for the proposed Pierce's Disease Control Program. However, further consultation may be required if (1) the measures outlined in the February 2, 2001 consultation letter and those outlined above are not fully implemented, (2) new information becomes available indicating that listed species or critical habitat may be adversely affected by the program, (3) new species are listed, or (4) current program plans change in a manner that affects listed species or critical habitat.

If you have any questions regarding this consultation, please contact Mr. Joe Dillon at (707) 575-6093.

Sincerely,



for

Rebecca Lent, Ph.D.  
Regional Administrator

cc: Bob Wynn, CDFA  
Aurelio Posadas, CDFA  
Jim Lecky, NMFS  
Jim Slawson, NMFS  
Michael Aceituno, NMFS  
Irma Lagomarsino, NMFS  
Patrick Rutten, NMFS





United States  
Department of  
Agriculture

Animal and  
Plant Health  
Inspection  
Service

Plant Protection  
and Quarantine

Western Regional Office  
9580 Micron Avenue, Suite I  
Sacramento, CA 95827

February 2, 2001

Mr. James R. Bybee  
NMFS - Habitat Conservation Division  
777 Sonoma Avenue, Suite 325  
Santa Rosa, California 95404

Dear Mr. Bybee:

The United States Department of Agriculture, Plant Protection and Quarantine, Western Region (USDA) requests concurrence that its Pierce's Disease Control Program, conducted in cooperation with the California Department of Food and Agriculture (CDFA) and the California County Agricultural Commissioners, is not likely to adversely affect salmonid species in California listed under the Endangered Species Act. Details of the program and the USDA's ongoing funding role are presented in the following paragraphs.

In August 2000, the Secretary of Agriculture transferred \$22.3 million to APHIS to support the Glassy-winged Sharpshooter (GWSS) program. This amount includes \$14.6 million for provision of Federal assistance in conducting survey activities for GWSS. The amount also includes \$5.3 million for a wide variety of research projects that focus on the development of new methods for mitigation and control of Pierce's disease and GWSS. The recipients of these funds include a broad cross section of Federal and State agencies, Institutions of Higher Education, and other entities with unique experience and capabilities to successfully obtain the research goals. The remaining \$2.4 million will be used by APHIS's to fund Agency direct costs and research related to the program. The USDA/APHIS predominate funding mechanism to ensure successful accomplishment of the program, is a cooperative agreement with CDFA for all aspects of the program excluding pesticide treatment activities. Attached you will find a copy of the cooperative agreement that details this funding arrangement (Attachment 1).

Even though USDA is not funding Pierce's Disease Control Program treatment activities, we are providing the following information to explain the program, specifically the treatment element and the steps that the CDFA takes to prevent and/or mitigate the impact to threatened and endangered species, including the endangered salmonids that are under the responsibility of the National Marine Fisheries Service (NMFS).

The CDFA has a great deal of experience conducting eradication programs. Numerous exotic fruit fly eradication programs have been successfully conducted by CDFA in southern California and the San Francisco Bay area with no impact to threatened and endangered species. Because the possibility of impact to threatened and endangered species was realized early, discussions were held with the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG). These led to the establishment of consultation procedures with both of these agencies, which were



APHIS - Protecting American Agriculture

formalized via Memoranda of Understanding (see attachment 2). The consultations involve notification within twenty-four hours of a decision to conduct an eradication program. The NMFS was also contacted early on during the initial establishment of the consultation procedures with USFWS and CDFG. However, the fruit fly eradication efforts have occurred primarily in the urban areas of the state and did not warrant a formal consultation procedure with NMFS. It should be noted that consultation with NMFS is currently in place, but not formalized. In discussions with Mr. Joe Dillon (NMFS); it is my understanding that this consultation now needs to be formalized between CDFA and NMFS for the Pierce's Disease Control Program.

### **Pierce's Disease Control Program**

#### The Problem: An Insect + Disease Pest Complex

The focus of the Pierce's Disease Control Program is actually an insect + disease pest complex: the glassy-winged sharpshooter (*Homalodisca coagulata*; GWSS) and Pierce's disease (*Xylella fastidiosa*). The primary problem is Pierce's disease, a bacterial disease that kills grapevines by clogging up their water-conducting vessels. Several strains of this bacterium exist, which attack and cause damage to different host plants including grapes, citrus, stone fruits, almonds, oleander, and certain shade trees (including oaks, elms, maples, and sycamore). There is no known cure for these bacterial diseases at this time.

The Pierce's Disease Control Program, as noted in the title, is not an eradication program, but a control program. The insect and the disease involved in this program are established in the state of California (see map, attachment 3). No treatment efforts are being undertaken in the generally-infested areas of southern California by the program. Aerial treatment of urban areas, such as occurred during early Mediterranean and Mexican fruit fly eradication programs, is highly unlikely. Eradication efforts may be undertaken on incipient infestations found in the non-infested areas of the state. However, the decision to eradicate or control would depend on various factors including location, size of the infestation, presence of threatened or endangered species, likelihood of success, etc. The goals of the program are to slow the spread of the insect vector (GWSS) and to develop methods for mitigating or curing Pierce's disease. The disease is the problem that needs to be dealt with in the long term. The program's first step is to control the movement of the insect to minimize its spreading the bacteria that cause Pierce's disease and other diseases, and then to initiate activities against the disease to further minimize the interaction with the vector and reduce the spread of Pierce's disease.

Biological control of GWSS is the preferred "treatment" option. However, until an effective biocontrol program is developed, no option other than treating isolated infestations with an appropriate pesticide will slow the spread of this pest. CDFA

realizes that treatment of infested areas is not sustainable over the long term. Therefore, funds are being expended for exploration to find biological control agents that will attack the different life stages of GWSS. These efforts have been fruitful, in that a parasitic wasp has been found that attacks GWSS eggs. This wasp has been transported from Mexico to California successfully, passed quarantine screening, and been released in limited numbers (see attachments 4 and 5). Current efforts focus on establishing a rearing facility and a population to rear the large numbers needed for release in various locations. Exploration will continue for biological agents that will attack the adult and nymphal stages of GWSS.

### The Glassy-winged Sharpshooter (GWSS)

GWSS is native to the southeastern United States and northeastern Mexico. It feeds on a variety of ornamental and crop plants. GWSS is almost ½ inch (12mm) long, with a dark brown to black body color and a lighter underside. The upper parts of the head and back are stippled with ivory or yellowish spots; the wings are partly transparent with reddish veins. On the sides of its body can be found white spots caused by its watery excrement. GWSS eggs are laid together on the underside of leaves, usually in groups of 10 to 12. These egg masses appear as small greenish blisters. These blisters become brown scars on the leaves after the eggs hatch. Nymphs emerge from the eggs in about two weeks and go through several wingless nymphal stages before becoming adults. There are two generations per year. GWSS overwinters as adults and begin laying egg masses in late February through May. The first generation matures as adults in late May through late August. The second generation egg masses are laid mid-June through late September; these develop into overwintering adults. GWSS builds large populations on a diverse array of host plants and is an aggressive flyer, traveling greater distances than native sharpshooters.

GWSS was first observed in California in 1990 and is now firmly established in the counties of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura, as well as portions of Kern and Santa Barbara Counties. Its economic importance was not realized until 1997, when significant damage to grapevines in the wine-growing area of Temecula, Riverside County, was linked to GWSS rapidly spreading the serious bacterial disease of grapevines known as Pierce's disease. GWSS also poses the threat of spreading almond leaf scorch, alfalfa dwarf, oleander leaf scorch, phony peach, and citrus variegated chlorosis.

### The Pierce's Disease Control Program

The Pierce's Disease Control Program was officially established in May 2000 through urgency legislation (SB671). However, efforts actually began earlier, following the discovery of serious damage to vineyards in Temecula, Riverside County. The program

was established to address the danger presented to the California grape industry from Pierce's disease and its vectors, specifically the newly established GWSS.

The Pierce's Disease Control Program has five elements designed to minimize the impact of Pierce's disease and GWSS in the state:

**I. Contain the Spread.** Prevent the artificial spread of GWSS to new areas of the state by regulating shipments of nursery stock and other commodities. Also, to slow the natural spread by responding (see below) to new detections.

**II. Statewide Survey and Detection.** Identify and monitor GWSS infestations and populations through trapping and visual surveys.

**III. Rapid Response.** Provide guidelines and oversight to local authorities to develop and implement workplans for responding to new infestations, including treatment.

**IV. Outreach.** Raise awareness about Pierce's disease and its vectors.

**V. Research.** Conduct research to meet California's needs for short-term and long-term solutions to Pierce's disease and GWSS.

It is my understanding that the NMFS is particularly interested in the Rapid Response element of the program. This includes treatment of new infestations by the local county agriculture department, the local public entity designated by the county board of supervisors to deal with any new GWSS infestations discovered in the non-infested areas of California.

In all instances, if the county decides to apply treatments in an area, advance approval is obtained from the county board of supervisors, county counsel, and CDFA. Before treatment begins, the infestation is delimited to determine its extent. Once the extent of the infestation is determined, the county takes action based on its approved workplan, specifically the Rapid Response section of the plan (see attachment 6). All treatments applied to date have been made with the permission of the owner or resident of the property. If GWSS is discovered in an agricultural setting, treatment may be the responsibility of the property owner, who applies them in a manner approved and supervised by the agricultural commissioner.

If it is determined that an infestation in an urban or residential area cannot be eradicated, then the infestation will be contained to the smallest possible area as determined by the agricultural commissioner and CDFA. This will generally involve treating only infested properties and requesting releases of biological control agents.

### Treatment Preparation

Before treatments begin, the county agricultural commissioner consults a California database of endangered and threatened species maintained by the California Department of Pesticide Regulation. If a threatened or endangered species is noted as occurring in the treatment area, the agricultural commissioner will contact USFWS, CDFG, or NMFS to determine appropriate mitigation measures. In addition, the NMFS and California Departments of Pesticide Regulation, Health Services, and Fish and Game are notified by CDFA when a new infested area is detected. Public meetings are held before each treatment to provide community members the opportunity to discuss the treatment process with environmental health and program specialists. Residents of the affected properties and adjacent properties are provided individual, advance notification as well as the label of the pesticide to be applied. Additionally a "help line" telephone number is established for area residents to call with their questions and concerns.

### Pesticide Use and Treatment Monitoring

All pesticide applications are performed in accordance with product labeling and applicable federal and state laws and regulations. Treatments are applied by trained and licensed professionals.

The California Department of Pesticide Regulation (CDPR) is the lead agency for approving and regulating the use of pesticides in California. The potential for impact on public health and the environment are considered by CDPR when registering a product for use in the state. The main consideration by CDFA for selection of a pesticide is whether the product is effective against the pest and whether it is labeled for use on the host plants found in the treatment area. However, the program also takes into consideration impacts to public health and the environment, and addresses these by training the contracted pest control operator on precautions to take during application (attachment 7) and arranging for environmental monitoring of the treated area. This monitoring includes sampling water, soil, air, and fruits and vegetables in the treatment area, as well as the tank mix. (See samples of final environmental monitoring report, attachment 8 and CDPR GWSS website page, attachment 9.)

The insecticide carbaryl is one of the recommended materials for use on the Pierce's Disease Control Program for control of GWSS. It was used in the new infestations detected during last season. This material is labeled for use in residential settings on a broad variety of ornamental plants and fruit trees. CDFA has experience with the material and has conducted an environmental review of its use (see attachment 10). Imidacloprid has also been used to a lesser degree. Imidacloprid has been used on ornamental plantings in commercial areas; it is not currently registered for use on fruits or

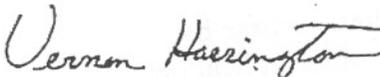
vegetables other than citrus, for which it has a Section 18 registration. Both of these materials are effective against GWSS.

The year 2000 was the first year that detection trapping and visual surveys were conducted for GWSS in California. The statewide detection effort was successful in locating new infestations in five counties: Butte, Contra Costa, Fresno, Sacramento, and Tulare. Monitoring by the local county agriculture departments showed a reduction in GWSS populations in all treated areas (see attachment 11). The county agriculture departments are trapping and conducting visual surveys this winter to monitor GWSS populations. Treatments conducted by contracted pest control operators may be implemented this spring depending on spring trapping and visual survey results.

### Conclusion

In conclusion, the Pierce's Disease Control Program is not an eradication effort. New infestations of GWSS were discovered in year 2000 in five counties and treatments were applied in these areas. CDFA has consultation procedures established with responsible agencies to protect threatened and endangered species, as well as sensitive areas, associated with program control efforts. CDFA has contracted for environmental monitoring of pesticide applications to verify proper amounts of pesticides used and determine residue levels in target and nontarget matrices. CDFA works closely with the local county agriculture departments during response to new infestations detected in non-infested areas. Based on the best information available, the safeguards taken, and the consultation processes followed, the program is not likely to adversely affect salmonid species listed under the Endangered Species Act in California.

Sincerely,



Vernon Harrington  
Assistant Regional Director  
Western Region, PPQ

Enclosures

cc;

Joseph Dillon  
Bob Wynn  
Helene Wright

## Enclosure List:

- I. USDA/CDFA Cooperative Agreement
- II. MOUs between CDFA and CDFG, and CDFA and USFWS
- III. Map of GWSS and PD
- IV. GWSS Biocontrol Handout
- V. Most Recent Biocontrol Report
- VI. Rapid Response Plan
- VII. Treatment Training Record
- VIII. CDPR Environmental Monitoring Reports
- IX. CDPR GWSS Website Opening Page
- X. Final EIR: Gypsy Moth Eradication Program in California. CDFA, 1992
- XI. Treatment Area Information and Maps





UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Southwest Region  
777 Sonoma Avenue, Suite 325  
Santa Rosa, CA 95404

August 30, 2000

Vernon Harrington  
USDA Dept. of Plant Protection and Quarantine  
Western Region  
9580 Micron Ave, Suite I  
Sacramento, CA 95827

Mr. Harrington,

On June 23, 2000, a \$22.3 million federal grant to the State of California was announced at a press conference in Menlo Park, CA. The grant is meant to aid in controlling the spread of the glassy winged sharpshooter (GWSS) and support research into curing Pierce's Disease which infected insects spread. I am writing to recommend a consultation process between our agencies concerning this grant.

The GWSS is recognized as a major emerging pest problem in California agriculture. Concern is so strong that the potential for aerial spraying of infected urban areas with organophosphate insecticides has been discussed by County Agricultural Commissioners. This option is often frowned upon by the Commissioners, but has not been pulled off of the table. The blanket application of insecticides across riparian zones, particularly from the organophosphate family, could be very harmful to listed salmonids and their designated critical habitat. Direct deposition into the water will greatly impact the aquatic insect food base as well as the fish themselves.

Most organophosphates are known to be extremely toxic to salmonids at very low concentrations. The chemical that was aerially applied in the heavily infected area of Temecula (Riverside County) was chlorpyrifos. Trade names for chlorpyrifos include Dursban® and Lorsban®. This insecticide has an acute toxicity level to mature rainbow trout of 9 µg/L (parts per billion) based upon a 96 hour LC50 test (Fifty percent of the test population dies within the 4 day exposure window.). Levels which cause sublethal effects that harm salmonid fry and juveniles are lower. The water quality standard recommended by the California Department of Fish and Game for protection of beneficial uses of freshwater for chlorpyrifos is 14 ng/L (parts per trillion).

The insecticide currently being ground applied in infected areas as part of the state's control plan is carbaryl (tradename Sevin®). This insecticide is not as toxic to salmonids as chlorpyrifos, but the 96 hour LC50 value for rainbow trout is 1.3 mg/L (parts per million). This concentration can



be exceeded in cases where the insecticide is directly deposited into water. Of the insecticides mentioned in this letter, carbaryl is the least toxic to birds. This may be the reason for its selection for the current applications.

In Northern California, the organophosphate insecticide dimethoate has been used for Blue-green sharpshooter control by direct application to riparian areas. It is also less toxic than chlorpyrifos (96 hour LC50 for rainbow trout = 6.2 mg/L), but may still result in harm to salmonids.

The University of California is also working on the Pierce's Disease and GWSS problem through several other avenues. These include trials to find more environmentally benign alternatives to the organophosphate insecticides. The use of one chemical, a chloro-nicotinyl insecticide called imidacloprid (Trade names include Admire®, Premier® and Gaucho®) may be particularly effective. The 96 hour LC50 value for rainbow trout for imidacloprid is 211 mg/L. A soil incorporated application shows good GWSS control that lasts for several weeks. It takes several days before the insect dies, but there are indications that the GWSS avoids plants which have taken up the insecticide. Additionally soil incorporation greatly reduces the chances of exposure to salmonids and other wildlife.

Due to the widely varied potential host plants of the GWSS, it is unlikely that complete control of the insect can be achieved. Thus far eleven counties have been declared infested with all counties of Southern California known to be heavily infested. The insect has been recently trapped in San Joaquin and Contra Costa counties in the San Francisco Bay-Delta region and in Lake county to the north.

In the North Coast region, there have been promising results with riparian area revegetation techniques to control the spread of the disease from the BGSS. Plants, mainly non-natives, that are known to host the bacteria or BGSSs are removed and then replaced with native varieties which do not support the insect and/or the disease. Early results show insect activity is reduced by 70 % to 99%. This technique may effectively replace the use of dimethoate, but may not prove effective for GWSS control if the pest becomes established in the area.

On August 2, 2000 Joe Dillon of our office had a conversation with you concerning this federal grant. At that time you stated that the paperwork for the funding was nearly complete and that we would receive a copy to review. Furthermore you stated that no funds from this grant were to be used for pesticide applications. However it was not clear how this affected the states plans to utilize matching funds they have designated towards GWSS control. At this time we have not received this packet and have not been contacted concerning the status of this process. A follow-up conversation Lloyd Wendel occurred on August 18, 2000. Mr. Wendel told Joe he believed that the funding package had been forwarded to Washington D.C. for legal review and that you would not be available again until the first week in September.

It is important that the US Department of Agriculture, who is awarding the \$22.3 million grant to the California Department of Food and Agriculture, realize that the grant process is a federal action and may require a section 7 consultation under the Endangered Species Act if the action may affect listed species. A federal action is defined in the Endangered Species Act as "All

activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies in the United States or upon the high seas." Depending upon the ultimate use of the federal and matching state funds, an impact on salmonids is a distinct possibility.

The National Marine Fisheries Service and the United States Fish and Wildlife Service are attempting to meet with the State to learn their plans for the GWSS program. However the State will not meet with us at this time. They are apparently forming another/new task force to address the problem and do not want to meet until that is in place. In the meantime, the state has already begun insecticide treatments of infected sites including residential and commercial areas. It is believed, but not known, that ground rig spraying is being conducted in these operations. It is also not known to us what precautions are being taken to insure insecticides are not deposited into streams and waterways in the infected area.

State Agricultural Secretary Bill Lyons, during a vineyard visit in Sonoma County on July 13, stated that the large scale use of the parasitoidal wasp species mentioned earlier and diligent inspections of nursery plants and bulk grape shipments by the County Agricultural Commissioners (not by the nurseries or grape growers themselves) will be the preferred method of combating the GWSS. He also declared that he is not a proponent of aerial spraying, but that it could not be eliminated as an option.

Aerial applications could affect listed salmonid species in California. There are eleven listed ESUs (environmentally significant units) of salmonids found in California south of Redwood Creek in Humboldt county which may be affected. Their designated critical habitat may also be adversely affected by this action. Please refer to the table at the end of this letter for a complete listing of the ESUs. There are also numerous species under the jurisdiction of USFWS that may be affected such as the Red-legged Frog and Valley Elderberry Longhorned Beetle.

Based upon Secretary Lyon's statements, this issue should be relatively easy to address if NMFS can provide technical assistance to USDA and CDFA to clarify their obligations under the ESA. Breeding and release of the wasps, a diligent inspection system and careful use of insecticides should slow the spread of the GWSS. Further developments in research being conducted by the State and the University of California should also be incorporated into the control efforts.

If you have any questions concerning this matter, please contact Joe Dillon of my staff at (707) 575-6093.

Thank you,



James R. Bybee  
Northern California Habitat Manager

cc: Secretary Bill Lyons, CDFA  
✓ Bob Wynn, CDFA  
Rich Marovich, C DPR  
Rebecca Lent, NMFS, Long Beach  
Rod Mcinnis, NMFS, Long Beach  
Jim Slawson, NMFS, Long Beach  
Steve Schwarzbach, USFWS, Sacramento  
Tom Maurer, USFWS, Sacramento

Potentially Affected Salmonid ESUs

ESU	Status	ESU Listing	Critical Habitat
<u>Steelhead trout</u> ( <i>O. mykiss</i> )			
Northern California	threatened	65 FR 36074, 7 Jun 00	Not yet designated
Central Valley	threatened	63 FR 13347, 19 Mar 98	65 FR 7764, 16 Feb 00
Central California Coast	threatened	62 FR 43937, 18 Aug 97	65 FR 7764, 16 Feb 00
South-Central California Coast	threatened	62 FR 43937, 18 Aug 97	65 FR 7764, 16 Feb 00
Southern California	endangered	62 FR 43937, 18 Aug 97	65 FR 7764, 16 Feb 00
<u>Coho salmon</u> ( <i>O. kisutch</i> )			
S. Oregon/N. California Coast	threatened	62 FR 24588, 6 May 97	64 FR 24049, 5 May 99
Central California Coast	threatened	61 FR 56138, 31 Oct 96	64 FR 24049, 5 May 99
<u>Chinook Salmon</u> ( <i>O. tshawytscha</i> )			
California Coastal	threatened	64 FR 50394, 16 Sep 99	65 FR 7764, 16 Feb 00
Sacramento River Winter-Run	endangered	59 FR 440, 4 Jan 94	58 FR 33212, 16 Jun 93
Central Valley Spring-Run	threatened	64 FR 50394, 16 Sep 99	65 FR 7764, 16 Feb 00
Central Valley Fall/Late Fall	candidate	64 FR 50394, 16 Sep 99	Not applicable

## Bibliography

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- Glassy-winged sharpshooter (GWSS) update (2000, July 3)
- Contact Information
- Task Force Report (1999, November)
- Host List

Norberg, B. (2000, June 24). \$22 million to help stop grape pest. Santa Rosa Press-Democrat

The Pierce's Disease/Riparian Habitat Workgroup (2000, February). Draft Information Manual - Riparian Vegetation Management for Pierce's Disease in North Coast California Vineyards

Siepmann, Stella and Brian Finlayson (2000), Water Quality Criteria for Diazinon and Chlorpyrifos, California Department of Fish and Game Pesticide Investigations Unit, Administrative Report 00-3

Smith, C. (2000, July 14). State rejects wine pest sprays, quarantines. Santa Rosa Press-Democrat

University of California, Division of Agriculture and Natural Resources website, Online Media Kit for Glassy-winged Sharpshooter and Pierce's Disease - <http://danr.ucop.edu/news/MediaKit/GWSS.shtml>

- Report of the University of California Pierce's Disease Research and Emergency Response Task Force (April 2000)
- Color Brochure - Glassy-winged Sharpshooter (Dec. 1999)
- Slide Presentation - Glassy-winged sharpshooter and the increased threat of Pierce's Disease in the San Joaquin Valley by Phil Phillips (Feb 16, 2000)

University of California, Division of Agriculture and Natural Resources website, Press Release (1999, October 6) - A new pest transmitting Pierce's disease spreads in California; UC scientists study control of the insect and the diseases it carries.

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX O**

**SAMPLE NOTIFICATION LETTER FROM  
THE CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE (CDFA)  
TO THE CALIFORNIA DEPARTMENT OF FISH AND GAME (CDFG) AND  
THE U.S. FISH AND WILDLIFE SERVICE (USFWS) CONCERNING PDCP  
TREATMENT ACTIVITIES, TREATMENT AREA BOUNDARIES, AND  
CALIFORNIA NATURAL DIVERSITY DATABASE SEARCH RESULTS**

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**DEPARTMENT OF FOOD AND AGRICULTURE**

1220 N Street, Room A-330  
Sacramento, CA 95814  
Telephone: (916) 653-9345  
Facsimile: (916) 654-0555



April 11, 2001

Mr. Donald Koch  
Department of Fish and Game  
601 Locust Street  
Redding, CA 96001

Dear Mr. Koch:

As part of the Statewide Pierce's Disease Control Program, the County Agricultural Commissioners, in conjunction with the California Department of Food and Agriculture (CDFA), are conducting control/eradication activities against infestations of glassy-winged sharpshooter (GWSS) in northern California. At present, GWSS infestations in five counties (Butte, Contra Costa, Fresno, Sacramento, and Tulare; see attached maps) are being treated using registered pesticides according to label instructions. The pesticides used are Carbaryl, Imidacloprid, and Cyfluthrin.

Attached are maps showing the regulated infested areas in each county. The regulated areas encompass the area within a one-mile radius around each site at which GWSS was found. The regulated area is larger than the actual treatment area. Within the treatment area, treatments are applied to residential or industrial areas or windbreaks immediately adjacent to these areas. There are no plans to treat undisturbed areas.

I have consulted the Natural Diversity Database (see attached maps for quadrangles searched) to determine if threatened or endangered (T/E) species exist within each treatment/regulated area. The results are listed on the attached page. No T/E species are located within the treatment areas but several exist within the regulated areas. Should it become necessary to treat undisturbed areas, the CDFA will immediately contact both the United States Fish and

Page Two  
April 11, 2001

Wildlife Service and the California Department of Fish and Game prior to starting pesticide treatments to ensure that no "take" of T/E species occurs.

We would appreciate any comments you might have about our project.

Sincerely,

Robert V. Dowell  
Primary State Entomologist  
Pest Detection/Emergency Projects  
Plant Health and Pest Prevention Services

Attachments

cc: R. Wynn, Jr.  
A. Posadas  
J. Hooper  
J. Prieto  
R. Spencer  
T. Esser  
R. Price  
L. Craft  
F. Carl  
E. Meyer

## T/E Species

<u>County</u>	<u>Within Treatment Area</u>	<u>Within Regulated Area</u>	<b>Species and Location</b>
<u>Butte/Chico</u>	No	Yes	<b><u>Tadpole Shrimp-</u></b> Near Little Chico Creek east of Chico <b><u>Meadowfoam-</u></b> Doe Mill and Bruce roads
<u>Contra Costa/Brentwood</u>	No	Yes	<b><u>Kit Fox-</u></b> In the area
<u>Fresno/Fowler</u>	No	No	
<u>Fresno/North of Fowler</u>	No	No	
<u>Fresno/Kingsburg</u>	No	Yes	<b><u>Kit Fox-</u></b> In the area
<u>Fresno/Fresno</u>	No	Yes	<b><u>Succulent Owl's Clover-</u></b> Faint Rd. N Junction with Hwy. 41
<u>Tulare/Terra Bella</u>	No	Yes	<b><u>Kit Fox-</u></b> In the area
<u>Tulare/Hesse Ave</u>	No	No	
<u>Tulare/Porterville</u>	No	Yes	<b><u>Elderberry Longhorn Beetle-</u></b> In plants along waterways <b><u>San Joaquin Adobe Sunburst-</u></b> 1km and 4km W Junction Rd. 276 and Ave. 176; 3km N Junction Locust and Grevilla <b><u>Stripped Adobe Lilly-</u></b> 3km W Junction Rd. 276 and Ave. 176 <b><u>Kit Fox-</u></b> In the area
<u>Sacramento/Sacramento</u>	No	Yes	<b><u>Bank Swallow-</u></b> Along American River <b><u>Elderberry Longhorn Beetle-</u></b> In plants along the water <b><u>Elderberry Longhorn Beetle-</u></b> In plants along waterways



**DEPARTMENT OF FOOD AND AGRICULTURE**

1220 N Street, Room A-330  
Sacramento, CA 95814  
Telephone: (916) 654-1211  
Facsimile: (916) 654-0555



October 31, 2001

Ms. Betty Warne  
U.S. Fish and Wildlife Service  
2800 Cottage Way Suite W-2605  
Sacramento, CA 95825

Mr. Rob Floerke  
CA Dept. of Fish and Game  
7329 Silverado Trail  
P.O. Box 47  
Yountville CA 94599

Dear Ms. Warne and Mr. Floerke:

The California Department of Food and Agriculture and the Santa Clara County Agricultural Commissioner are establishing a glassy-winged sharpshooter treatment zone in Santa Clara County. This treatment zone is in the vicinity of the intersection of Branham Lane and Almaden Expressway. A map of the proposed treatment area is included. Treatments will consist of foliar sprays of a contact insecticide such as carbaryl or imidacloprid and soil drenches of a systemic insecticide such as imidacloprid applied to GWSS host plants on properties within a 400-meter radius of each find site. The San Jose East and West Quadrangles have been examined for T/E species. The California Natural Diversity DataBase indicates that no T/E species or species of concern reside within the treatment zone boundaries. There are no plans to treat any riparian, marsh, or sand dune habitats. All treatments will be applied to developed properties.

Any comments you might have on our project are deeply appreciated.

Sincerely,

A handwritten signature in cursive script, appearing to read "Robert V. Dowell".

Robert V. Dowell  
Senior Economic Entomologist  
Pest Detection/Emergency Projects  
Plant Health and Pest Prevention Services

Enclosures

cc: Charles Bare, USDA/APHIS/PPQ  
Scott Flint, CDFG  
Loren Hayes  
Tom Esser  
Greg Van Wassenhove  
Robert Wynn  
Roger Spencer  
Jim Rains



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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX P**

**CHEMICAL HAZARD AND RISK EVALUATION**

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# CHEMICAL HAZARD AND RISK EVALUATION

## Chemicals and Life

All matter is made up of chemicals. Living organisms are complex systems of matter that support continuous (spontaneous) chemical reactions of a specific nature (many of which are interdependent) that constitute the character of life and give an organism its individual characteristics. In order for these reactions to continue, living organisms require a constant supply of substrates (food) for the reactions to proceed. These reactions produce the energy used by living organisms to act independent of one another, and from the surrounding inanimate environment. Byproducts of these reactions (waste) must be removed. Because living systems are a collection of chemicals and chemical reactions, they are subject to reactions with other chemicals that may disrupt the system. Living organisms have an ability to repair minor disruptions and maintain their integrity. If critical functions become inoperable, the organism may die, i.e., the chemical reaction system ceases.

Chemicals that are not compatible with living systems can present hazards for living organisms. In addition to toxicity (chemical interference with the established system), hazards include combustibility, causticity, corrosiveness, and reactivity. Each of these properties presents a hazard to varying degrees depending on the extent of interference. The following discussion will focus on hazards associated with chemical interactions.

Allergy is distinct from chemical toxicity. Chemical toxicity is due to the direct disruption of normal biological processes (chemical reactions), and is directly related to the amount (dose) of chemical present in the system. Allergic reactions are NOT due to direct chemical disruption, but occur when the body's own immune system releases an overabundance of chemical substances, such as histamine and antibodies, that ordinarily serve as a defense against infectious organisms or alien molecules. The excess of these naturally released substances is directly responsible for the biological disruptions that then occur. Neither of these primary or secondarily induced disruptions is desirable. Medical management of each situation is different according to the nature of the involved biological interactions.

## Toxicology

### General Principles

Paracelsus, a 16th century physician, made the following observation: *All substances are poisons; there is none which is not a poison. The right dose differentiates a poison and a remedy.* This is now a well established axiom in toxicology: **TOXICITY IS DOSE RELATED.**

The character of toxicity does not vary significantly when comparable doses of the same chemical are given to different individuals of the same species. There may be individuals within a species, however, in which some characteristic feature is lacking, e.g., a missing enzyme, in which case they may react differently than the rest of the population. These genetic differences can be identified. While individuals of the same species react very similarly to a chemical,

different species may react differently to the same chemical because the genetic make-up that differentiates one species from another varies.

A number of factors can influence the effect a given dose of a chemical may have on an individual. These factors most often affect the rate of absorption, metabolism, or excretion of the chemical. Some of these factors are: The route of administration, e.g., breathing it into the lungs, getting it on the skin, swallowing it, or injecting it; the physical state of the chemical, e.g., solid, liquid, or gas; the presence or absence of other chemicals in the body, e.g., drugs, foods, or other substances; age and sex of the individual (hormonal influence); genetic variables; physical activity (metabolic status); nutritional state; illness or disease; and even the time of day.

### **Dose Characteristics**

The duration of time over which a dose (specific amount) is received will influence toxicity. Twelve aspirin tablets given all at once will have a different effect than two aspirin tablets given every four hours over a 24-hour time period (total dose - 12 tablets). Even though the same amount is received for a 24-hour period, the distribution of the dose during that period can influence what will happen. Why is this?

Chemicals that enter the body interact with the biological system. The body has built-in mechanisms to maintain itself. Besides processing nutrients, the body sorts out and reacts with other substances that are foreign to it, and protects itself against harmful reactions. When a relatively large amount of a chemical suddenly enters the body, not all of it can be reacted with immediately. When the body's capacity to react to a foreign chemical is exceeded, vital functions may be disrupted. Once an adequate amount of the interfering substance is processed (metabolized and/or excreted), normal function can resume, provided no irreversible damage occurred, e.g., destruction of vital tissues. If the amount of a harmful chemical in the body overwhelms the system, serious consequences, including death of the individual, may occur. If you eat too much food at one time, you can become sick, however, as you digest (process) the excess, you recover. Extreme overeating can lead to death.

Some chemicals are processed rapidly once they get into the body while others are processed more slowly. If the rate of intake is less than the rate of removal, the material will not build up in the body. If the amount in the body remains less than amounts that interfere with normal function, there is no noticeable adverse impact. Drugs prescribed for therapeutic purposes are given periodically over time periods to maintain a "therapeutic level" in the system. The frequency of administration is based on how fast the chemical is absorbed and eliminated after it gets into the body, while the amount given is based on the desired effect. People are regularly exposed to small amounts of chemicals with known significant toxic potential without suffering adverse consequences, i.e., being poisoned. Some common exposures are: *arsenic*, a naturally occurring element that can be severely toxic to humans if large amounts are absorbed; *cyanide*, which occurs naturally in some foods, can be lethal in relatively small amounts compared with many other chemicals; *carbon monoxide*, which is present in automobile exhaust, cigarette smoke, and from burning charcoal, among other sources, can be lethal or permanently disabling to people if they breathe moderate concentrations for a relatively short period of time.

The human body's chemical processing system is complex. The body effectively handles most chemicals it absorbs. Once absorbed, chemicals may be distributed throughout the entire body. Distribution of some chemicals may be selective, with various organs receiving disproportionate amounts. Metabolism and excretion are major processes that act on absorbed chemicals. While most absorbed chemicals are either destroyed or removed from the body, some chemicals may be converted (metabolized) into more harmful molecules (metabolites) in the process and others may be stored or held within various tissues, most often fat, for prolonged periods of time. In the vast majority of cases, toxic effects disappear as chemicals are metabolized and excreted. Chemicals stored in fat do not necessarily cause harm. Because they are more or less trapped in fat stores, they are not available to react. Obese people who suddenly use stored fat, such as when going on a "crash" diet or when suffering from a debilitating disease, may show signs of toxicity from agents that had previously been stored that are being released as the stored fat is metabolized ("burned") for energy.

## **Evaluating the toxicity of chemicals**

### **Dose-Response**

Chemicals are given to laboratory animals at different doses and by different routes of administration for various periods of time to test for toxicity. The biological response to a chemical may vary between species of test animals but, in general, will be similar for individuals within a species. Some animals will respond to smaller doses than others.

The lowest dose at which any animal shows a response is called the response threshold. The most susceptible test animals in a study determine this response level. A dose less than the response threshold does not cause an observable effect in any animal in the test population. The response threshold is difficult to measure. Therefore, two additional response levels are defined. The highest dose administered to test animals at which no response is seen, is called the **No Observable Effect Level (NOEL)**, and the lowest dose at which an effect is seen, is called the **Lowest Observable Effect Level (LOEL)**. The response threshold will lie somewhere between these two dose levels. The variable response range is the range between the response threshold and the lowest dose to which all animals respond. This range defines the magnitude of difference in individual susceptibility to a given effect. A distinction may also be made between the lowest dose at which some effect may be seen, such as a slight loss of body weight, and a dose that causes an effect considered to be adverse. To distinguish between the NOEL (any effect) and the lowest adverse effect dose, reference is sometimes made to the **No Observable Adverse Effect Level (NOAEL)** or the **Lowest Observable Adverse Effect Level (LOAEL)**. (Chemically induced cancer is a different process and will be considered separately.)

### **Single Dose**

As a general rule, dosing progresses from very small amounts until amounts that are lethal are reached from a single administration. A dose-response curve is thereby defined, in which the amount given is plotted against the number of animals responding. In general, depending on the specific effect, if large enough doses are given, all individuals will eventually respond<sup>1</sup>.

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<sup>1</sup> For some effects, the effect may not be seen in all animals before lethal amounts are reached.

A common measure used to compare the lethal potency of chemicals is the LD<sub>50</sub>, or lethal dose 50. This is the dose which, when administered to a group of animals, will result in death of 50 percent of the population. The lower the LD<sub>50</sub>, the more potent the chemical is.

Another common measure for an effect, other than a lethal effect, is the ED<sub>50</sub>, or the effective dose 50, which is a dose that, when given to a group of animals, will cause a given effect to occur in 50 percent of the animals.

Both the LD<sub>50</sub> and ED<sub>50</sub> are determined from experimental studies in laboratory animals. The numerical value will vary according to the species of animal (rats, mice, rabbits, monkeys, etc.); how it was administered (oral, dermal, inhalation, or injection routes); and what vehicle it may have been mixed with, e.g., water, corn oil, an organic solvent, etc.

### **Multiple Doses**

In addition to single dose effects, it is important to know what effects, if any, could occur if someone were to be exposed to a chemical repeatedly for a prolonged period of time, perhaps an entire lifetime. One of the easiest ways to achieve lifetime administration to laboratory animals is to incorporate the chemical of interest into their diet. As noted above, toxicity may differ if the same daily dose is given all at one time or in smaller amounts throughout the day. Administering a chemical to each animal individually involves greater disruption and handling of the animals and is more difficult. Daily single dose administration may be utilized to administer chemicals for short time periods, such as when evaluating birth outcome where the chemical is given to animals only while they are pregnant. With individual dosing, each animal is given the same relative amount of a test chemical, whereas when the chemical is mixed in the diet, some animals may eat more than others in proportion to their body weight; therefore, the dose each individual may receive could vary. Higher peak concentrations may be reached in the body when single daily doses are administered, but higher total daily doses may be achieved if the material is given in smaller amounts throughout the day.

Obviously, the number of different dose levels one can administer to animals over their lifetime is limited by the sheer magnitude of possibilities. The dose-response curve for lifetime administration of a chemical, for practical reasons, cannot be as well defined as it can for single, one-time administrations.

Lifetime studies are usually conducted with rodents. Most often both rats and mice are used. Current U.S. EPA guidelines require that at least fifty animals of each sex be assigned to each dose level to be tested. Two or more different dose levels are required, plus a group of animals that are not given the test chemical during the same time period. This last group is the control group. Animals not given any test chemical may exhibit health abnormalities which reflect the natural condition of the animals, i.e., not all irregularities observed in a chemically exposed population are necessarily due to the chemical being administered. A comparison is made between the rate of occurrence of health abnormalities in each dose group as well as in control group animals. In addition to a concurrent control group of animals, study results are often compared with "historical" experience as an additional comparison. This compares the results of

a study with the incidence rate of naturally occurring conditions for a particular species of animal observed over many generations for a long period of time. If the concurrent control animals are observed to have significantly different incidences, either greater or less than historical control animals, this may indicate some unrecognized influence on the study results, or perhaps a random bias. Such studies may need to be redone. Studies of this nature are expensive as well as time consuming.

Oftentimes, an interim sacrifice of a portion of animals in each dose group is done in order to determine if effects may be occurring that cannot be detected by simple observation. These would be effects such as changes in the make up of the blood, kidney abnormalities, etc.

The normal life expectancy for laboratory rodents is about two years. To help compensate for the short life span rodents have compared to humans, animals are given doses up to the maximum amount of chemical they can tolerate without shortening their life expectancy or producing major health deficiencies, such as severe weight loss or malnutrition. This dose is referred to as the **Maximum Tolerated Dose (MTD)**. If the amount given to a group of test animals exceeds the MTD, the observed results are suspect inasmuch as some abnormalities may be due to general debilitation of the animals. This also may call for redoing the study at lower doses.

### **Hazard Evaluation**

In addition to the dose-response relationship, one must consider the nature of induced effects. Hazard evaluation considers whether an effect is serious and life-threatening, or if the effect is mostly bothersome or a nuisance. In some cases, an effect may not cause any symptoms, and would be detectable only if blood or urine tests were done at the right time.

Is the effect reversible or irreversible? Most often, toxic effects are temporary and complete recovery occurs when the chemical is eliminated from the body. There are, however, many exceptions to this generalization. Some notable exceptions are poisoning by metals (e.g., lead, mercury, arsenic) that accumulate in the body, and cirrhosis of the liver that accompanies prolonged heavy drinking of alcoholic beverages. In most cases, lasting effects will occur only after exposure to relatively large amounts of certain chemicals, either as a single massive exposure, or to moderate or large exposures over a prolonged time interval. Prolonged exposure may be the result of occupational involvement, hobbies that involve the regular use of certain types of chemicals, or from regular exposure to naturally occurring substances, such as drinking water that contains naturally occurring contaminants.

The nature of any possible hazard needs to be included in assessing the acceptability of a risk.

### **Cancer**

Cancer can be thought of as a self-replicating injury. Once the process starts, it can continue on its own without any need for the causative agent to remain present. The initiation of cancer by chemicals is considered to be non-threshold in nature, i.e., no matter how small an amount of a carcinogen is present, some possibility exists for it to initiate the cancer process. By inference, a single molecule of a chemical at the right location in a cell may alter the cell and make it malignant. Without evidence to the contrary, no amount of a carcinogenic chemical is considered

to be without some risk of initiating the cancer process. The number of people who might get cancer from exposure to a carcinogenic chemical is, however, still dose-related because the amount of chemical present affects the chance that an active molecule will reach a susceptible location in a cell. In addition, the body has defense mechanisms that resist the production of altered cells, thereby counteracting, to some extent, the chance of cancer cells taking over.

Not all tumors are malignant, or “cancer.” Chemicals that cause tumors are called oncogens or tumorigens, and are said to be oncogenic or tumorigenic. Chemicals that cause cancer are said to be carcinogenic, and are called carcinogens. Noncancerous tumors are said to be benign. All carcinogens are oncogenic, but an oncogen is not necessarily carcinogenic.

Most benign tumors do not become malignant, however, because some tumors originally thought to be benign are later found to be malignant, government regulatory agencies tend to treat all chemicals capable of inducing oncogenic changes as if they were carcinogenic, and tend to classify most oncogens as carcinogens for the purpose of regulatory action. In determining potential cancer risk from exposure to carcinogens, all tumors, benign or malignant, are most often included in numerical estimates of cancer risk.

Known carcinogens, for the most part, are associated with specific types of cancer. Different carcinogens are associated with different kinds of tumors. Examples people may be familiar with are: cigarette smoking and lung cancer; aniline dyes and bladder cancer; and vinyl chloride and liver cancer. There is a misconception held by many that a carcinogenic chemical is capable of causing cancer in general. Experimentally, only certain types of cancer are associated with a specific carcinogen, e.g., exposure to an agent that is known to cause skin cancer does not necessarily increase the risk of contracting stomach cancer, and vice versa. There are some studies reported in the literature of multiple site cancers arising from a single chemical, however, this is the exception rather than the rule.

## **Risk Assessment**

### **Extrapolating Test Data from Laboratory Animals to Humans**

Science, as a discipline, searches for essential truths (facts). Technology needed to provide precise answers to questions concerning risk is not always complete. There is obvious uncertainty in trying to predict the risk of unknown hazards; however, this is what is necessary if one wishes to prevent unwanted events from ever happening.

Regulatory agencies are charged with protecting the health of citizens irrespective of many unknowns and uncertainties. To fulfill this responsibility, data extrapolation and assumptions are used in place of missing factual information. Otherwise, setting exposure limits would be arbitrary.

When using data from laboratory animals to predict human responses, "conservative" (health protective) default assumptions are used. It is important to distinguish between assumptive risk projections made by regulatory agencies for the purpose of setting protective exposure limits, and actual experience.

Projections of uncertain hazard or risk are sometimes presented as being "scientific." Whenever assumptions are included in a formula, answers are no longer the result of scientific discovery or knowledge. Even though assumptions may be derived from limited facts, the best that can be said for projections which use assumptions is that they are "educated guesses." Assumptions would not be necessary if facts were known.

The MTD given to laboratory animals will ordinarily exceed the amount any human might be exposed to by several orders of magnitude. (An "order of magnitude" is a multiple of 10, two orders of magnitude is a factor of 100, three orders of magnitude is a factor of 1,000, etc.) A difference of one order of magnitude exists between 10 and 100, as it does between 100 and 1000, even though the numerical difference between 10 and 100 is 90, and the numerical difference between 100 and 1000 is 900. The difference between 10 and 1,000 is two orders of magnitude.

In extrapolating data from laboratory animal tests to estimate risks for humans, the data are "adjusted" to resemble human circumstances. Large doses given to laboratory animals for two years are regarded as being equivalent to what would happen to humans if proportionately smaller doses were given to them over 70 years. This extrapolation ignores time and dose factors that influence dose-response as discussed under **Dose Characteristics**.

For the purpose of extrapolation, when data from humans is lacking, humans are assumed to be as sensitive as the most sensitive species tested. If an effect is seen in mice but not in rats, human risk projections are based on what happens in mice. If the same effect occurs in both rats and mice, data from the most sensitive species is used. If, however, an effect is seen in an animal that is directly related to a biological condition that is not present in humans, such an effect may be disregarded in determining risk for humans.

It is presumptuous to calculate human sensitivity to an effect that has never been observed in humans from data derived from other animals. Experimentally, one cannot accurately predict what will happen in rats based on what happens in mice, even though they are both rodents. Extrapolating from rodents to humans disregards greater biological variability, and involves less certainty. Nonetheless, animal models have proven to be of value in assessing hazard potential of chemicals. The use of animal models to predict human hazards is based on prior experience with some models and past correlations.

### **Cancer Risk Determination**

The incidence of cancer in the general human population is about one in three (33 percent). The calculated risk of getting cancer as a result of being exposed to a specific carcinogenic chemical is based on how much cancer is found above background incidence in laboratory animals when they are given increasing doses. The dose observed to cause tumors in laboratory animals is used to calculate (extrapolate) the potential response rate when exposure will be very limited. These calculations address total population experience and do not take into account sub-populations whose vulnerability may be more or less than the rest of the population.

From a biological standpoint, we know that the body is capable of defending itself against cancer. At this time, however, the biological processes responsible for these defenses are poorly understood. We do know that if the body's immune system is artificially suppressed, as when immune suppressing drugs are given to people who have received organ transplants, the risk of getting cancer is greatly increased. Other protective influences are known to exist, but our understanding of these influences is limited at this time.

Experience suggests that a single limited exposure to a carcinogen does not necessarily cause a measurable increase in the occurrence of cancer. For example, people who smoke a single cigarette are not very likely to have a measurably greater incidence of lung cancer. People who smoke cigarettes for several years and then stop are less likely to get lung cancer than those who continue to smoke. The increased risk of getting lung cancer due to having smoked decreases the longer one abstains. Most carcinogens do not produce cancer in every exposed animal, even when the entire population is given maximum tolerated doses for their entire lifetime. None of these off-setting influences, which are affected by dose, are factored into cancer risk calculations, largely because our knowledge is incomplete.

Mathematically, we can calculate how many cancers might occur from exposure to one-half of a molecule of a carcinogen. This is meaningless, however, because one-half of a molecule is no longer the same chemical. Even though we can calculate a number to forecast cancer occurrence at doses many orders of magnitude less than what can be measured, biologically it is unrealistic to assume some members of a species (e.g., humans) may be a million or a billion times more susceptible to an effect from a chemical than other members of the same species.

Similarly, we can calculate how long a person would have to be exposed to some finitely small amount of a chemical with a non-threshold effect and come up with an answer of hundreds or thousands of years or more. Once we get beyond the biological life expectancy for humans, it becomes meaningless in terms of risk projection.

Technology has not advanced to the point that we are able to accurately measure biological limits for carcinogenic responses. Risk calculations do not take biological limitations into account. They do, however, provide a uniform means to express carcinogenic potency for the purpose of relative comparison. Biological parameters are mostly ignored or abandoned in these calculations, largely because of uncertainty. In other words, the mathematics may be accurate, but they do not necessarily reflect biological realities. Assumptions are generally conservative in order to remain biased towards health-protection.

For a personal perspective, one might consider that the risk of getting cancer during one's lifetime is known to be about one in three, based on general population incidence rates. This amounts to 333 chances in 1,000, or 333,333 chances in a million. If those chances are increased by one in a thousand, the numbers become 334 chances in 1,000, or 334,333 chances in a million (an increase of 1,000 chances in a million) for the individual. Risk is based on an assumption of a life expectancy of 70 years. The full magnitude of the calculated risk potential is not reached until a person reaches the age of 70 years, i.e., it will take that long before exposure reaches the

level on which the risk has been calculated. How concerned one should be over risks of these magnitudes is a personal decision.

From a population perspective, an increase in cancer of one in one-thousand translates into an additional 1,000 cancers in a population of one-million people. If the total population is 200 million, it would amount to 200,000 additional cases of cancer. For regulatory purposes, the calculated lifetime dose yielding a cancer risk of one chance in a million, would increase an individual's chance of getting cancer from 333 per 1,000 to 333.001 and potentially result in 300 additional cancers in a population of 300 million people. There is a problem with this illustration, however. The "risk" is not based on actual occurrence rates. It is a statistical estimate of chance (probability). The actual occurrence may be as low as zero. Whatever it may be, practically, it is not measurable.

More than one formula can be used to calculate cancer risk. Since actual occurrence rates cannot be measured at doses approaching zero, uncertainty exists with respect to what the actual biological response rate might be. Using calculated doses derived from unverified assumptions to forecast biological occurrence rates is misleading and misrepresents the character of these calculations, which are primarily for regulatory purposes. These calculations provide uniformity for setting exposure limits.

The measured rate of tumor occurrence at high doses is not directly proportional to the dose, i.e., the number of tumors occurring at one dose will not necessarily double if the dose is doubled, and the change in response between one dose and another may be different for different chemicals. Several different mathematical formulas have been developed that come close to calculating the change in response that can be measured at high doses. The same formulas, however, can give answers that differ by orders of magnitude when used to calculate response rates for minute doses where the response rate cannot be measured. This is very significant if one wishes to provide a standard degree of protection. The difference between an occurrence rate of one in 100,000 and one in 1,000,000 is only one order of magnitude. This shows just how large the uncertainty can be when estimating response rates that cannot be measured.

Determining and managing cancer risks is desirable even in the face of many uncertainties. It is important that people understand what is known and what procedures are used to make up for what is not known. We need to understand what goes into a risk calculation if we want to apply our own value judgments to decide whether or not a risk is personally acceptable.

### **Establishing Acceptable Exposure Limits For Chemicals**

The nature of a hazard is qualitative, and not easily expressed mathematically. Risk is the chance, or probability of an event occurring, and is based on statistics. Hazard is the event itself. Individuals may choose to accept a large risk if the event itself is not particularly harmful, and choose not to accept even a relatively small risk of a serious threat. For example, the risk of getting wet if you go out in the rain (high probability, low hazard) may be acceptable, but the risk of an accident causing injury if you live near a nuclear reactor (low probability, high hazard) may not be acceptable to many people.

In evaluating a hazard, the degree of harm is considered. Government agencies tend to regulate hazards that are deemed controllable and most harmful to the public. Workers are allowed to face greater risks in the work place if a hazard is minor than if major injury could result. In protecting the general public from hazards resulting from potential incidental exposures, less risk is allowed due to the involuntary nature of such exposures. The mere possibility that something could happen means that some degree of risk is present, even if it cannot be measured. For all practical purposes, zero risk is not attainable. The hazards associated with a particular chemical cannot be readily changed, but in most cases, the risk of experiencing hazards can be reduced to levels that one can reasonably accept.

For carcinogens, an acceptable exposure (risk) level is established by government regulatory agencies based on a number of factors, including how important or necessary the chemical is (many drugs that are effective in the treatment of cancer are themselves potent carcinogens), the number of people that are likely to be exposed, and the ability to exert some degree of control over exposure. If there are no off-setting considerations, the generally accepted exposure level to carcinogens is no more than one in a million chance that it will cause a cancer. Such a calculated risk needs to be understood both biologically and mathematically.

### **Margin of Exposure**

To compensate for uncertainty in data extrapolations and for voids in the biological data base, additional safety factors are incorporated into formulas regulatory agencies use to set exposure limits for humans. Using the lowest NOEL established in laboratory animals as a reference point, an additional uncertainty factor is added, depending on the degree of confidence regulators have in the available data. The usual practice is to reduce the NOEL for laboratory animals by a factor of 10 to allow for the possibility that humans may be more sensitive than the most sensitive test animal, and by another factor of 10 to allow for differences in individual responsiveness. In some cases, the limit is reduced even further if data are incomplete. Thus, a Margin of Exposure (MOE) for humans is set at one to three (or more) orders of magnitude less than the greatest amount administered to laboratory animals at which no effects were seen<sup>2</sup>. It should be kept in mind that no animals respond at the NOEL, and only some animals respond at the LOEL. Individual difference in responsiveness is, therefore, already accounted for in the test data, and the adjustment for individual sensitivity is actually redundant. The factors of 10 and 100 have no biological basis, i.e., they are simply numerical adjustments to provide reasonable assurance of no harm. They are primarily value judgments.

Exposure to chemicals in the environment depends not only on the exposure environment, but on individual behavior and activity. Humans are provided a great deal of protection by government regulatory agencies when it comes to allowable exposure limits to pesticide residues on foods. Significant margins of uncertainty are incorporated into Reference doses (R<sub>f</sub>Ds), which limit

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<sup>2</sup> Compare the margin of exposure for non-therapeutic chemicals with the Therapeutic Index for drugs. A therapeutic index is the difference between the amount needed to get the desired effect and a dose that causes toxicity. The closer the toxic dose is to the therapeutic dose, the greater likelihood there is that toxicity may occur. Unwanted effects from drugs are most often referred to as "side effects." If the chemical had no beneficial effect, these same effects would be called toxic effects. The Therapeutic index for some drugs is less than one, i.e., some unwanted "side effects" are to be expected if a therapeutically effective dose is to be given.

residues on food. Exposure limits are based on an assumption of exposure for an entire lifetime and are expressed as a daily average. Individuals may find themselves occasionally, or temporarily, exposed to chemicals in amounts that exceed daily reference values. In actuality, exposure consists of greater and lesser amounts on any given day, with the recommended lifetime average not to exceed the daily reference. That is, the R<sub>f</sub>D is not a one-time, single exposure, maximum limit. As long as an acutely toxic dose is not reached and the cumulative lifetime exposure does not average more than the R<sub>f</sub>D, the desired margin of exposure is achieved.

Exposure to chemicals is part of daily living. Most exposures are not governed by formal risk analysis or exposure limit recommendations. Unless an adverse experience has already occurred, the toxicity, both qualitative and quantitative, has never been measured for most potential exposures. Occupational exposure to chemicals is limited where specific hazards are known to exist. Again, the toxicity of many industrial chemicals has not been determined. Exposure assumptions for workers are different from those that are applied to the general public, and allowable exposure limits are generally greater. In contrast to pesticide residues on food, no standard MOE has evolved for occupational exposure to chemicals. Worker safety is a separate consideration and worker protection is under the jurisdiction of designated government regulatory agencies.

### **Scientific Progress and Data Gaps**

As with other fields of science, advances are being made in the field of toxicology. With each discovery, more knowledgeable evaluations are possible. In order to update existing information, government regulatory agencies require new evaluations of chemicals tested prior to technological advances. Whenever additional information is requested, a regulatory "data gap" is created. A single new test may take several years to complete. Unless a significant new hazard is suspected for a chemical, regulatory agencies ordinarily allow an appropriate amount of time for additional data to be developed without disrupting existing registration. Knowledge gaps due to deficiencies in technology are the driving force behind innovation and research aimed at reducing uncertainty. The desire to act despite the existence of uncertainties is obvious, and has been discussed.

### **Proving Safety (lack of potential for harm)**

It is impossible to prove something will *not* happen. Even after a thorough toxicity evaluation, it is always possible that some potential action may exist that was not observed. There is no absolute proof of harmlessness. One cannot show what is not there. After appropriate evaluation, however, if an effect is not demonstrated, there is reasonable assurance of a low (unmeasurable) hazard potential. The absence of convincing evidence that an effect occurs, provides relative proof of non-existence. It is unreasonable to insist on a guarantee of absolutely no risk, and unrealistic for anyone to try to meet a challenge that calls for absolute proof of nonexistence. Virtually all chemicals (or any human activity, for that matter) will have some hazard potential. A chemical itself cannot be referred to as "safe." The term "safe" can only be used to describe the manner in which a chemical is used. Toxicity tests are used to determine what a chemical's hazard potential may be. This information is then used to determine appropriate measures that will allow a material to be used safely.

## **Illness Evaluation**

In evaluating illness symptoms, it is necessary to consider all potential causes. Even when a person has been exposed to a hazardous material, it is important to consider that coincidental symptoms may or may not be related to the exposure. A wrong diagnosis can lead to inappropriate, ineffective, or, even worse, harmful treatment. How much could have been absorbed? Does the timing, severity, and nature of the symptoms match what is known to result from the kind of exposure the person had? Since toxicity is dose related, severe symptoms with minimal exposure would suggest something else may be involved. If there is reason to suspect a possible relationship between chemical exposure and a person's symptoms, the suspected diagnosis needs to be confirmed, if possible, through appropriate diagnostic tests. There is no way to absolutely prove that a coincidental chemical exposure could not be contributing to an illness. Even when an unrelated cause for an illness is confirmed as being responsible for an individual's symptoms, it can always be postulated that a chemical exposure somehow contributed, and challenge the medical community to prove otherwise. The virtual impossibility of meeting this challenge does not lend support to an allegation of chemical causation.

## **Using Hazardous Materials Safely**

In order to use a chemical safely it is necessary to know what hazards are associated with it. Once toxic and other hazards are identified, it is possible to formulate safe use strategies. The proposed use or application of a chemical will have its own specifications with respect to the amount required to achieve the desired purpose and the manner in which the application needs to be accomplished. Once these characteristics are known, it is possible to evaluate potential exposure and risks associated with the proposed use.

Risks can be mitigated through a variety of procedures. Manufacturing, packaging, storage, transportation, and prescribed handling procedures, each offer challenges when it comes to safe handling and use. Limiting the amount to be used to only what is necessary to achieve the intended purpose will limit exposure potential. If more than one agent can be used to achieve the same result, selecting the least hazardous material available will reduce any potential for undesirable or unwanted "side effects." In addition, users need to be made aware of hazards and proper handling procedures if they are to avoid unsafe actions. Careless handling is not an attribute of the material being used. How a material is handled and used determines if the activity is safe or not.

An example of a hazardous material that can be, and is, used safely is gasoline. It is common knowledge that gasoline is explosive, and one should not use gasoline near open flames. When gasoline is burned, carbon monoxide is formed as a byproduct, which itself can be fatal. Swallowing gasoline can lead to serious adverse health consequences, as can inhaling gasoline vapors. If gasoline is spilled onto the skin, it can cause severe skin irritation, which can be minimized or avoided if it is washed off within a relatively short period of time. In addition, gasoline can kill plants, dissolve a number of synthetic materials, cause clouding of plastics, and result in a number of other non-health related, undesirable consequences. Even when used properly and carefully, accidents may occur which can result in serious adverse impacts. These known hazards and risks are generally accepted by the public as necessary if they are to continue

to receive the benefits that the use of gasoline provides. Consideration of these trade-offs is generally referred to as a risk-benefit analysis.

Toxicity does not mean chemicals cannot be used safely. Toxic hazards can be mitigated by limiting potential exposure to less than toxic amounts. *The right dose differentiates a poison and a remedy.*

## The Use of Pesticides in the Pierce's Disease Control Program

An important aspect of the Pierce's Disease Control Program is the application of chemical pesticides to reduce or eliminate populations of the glassy-winged sharpshooter. All applications must be in compliance with federal and state laws and regulations (United States Environmental Protection Agency (US EPA) and California Department of Pesticide Regulation (CDPR)). The CDPR pesticide registration program was approved under the California Environmental Quality Act (CEQA) as meeting the requirements of the Act with respect to environmental review of pesticide use. Therefore, the use of pesticides registered by CDPR according to approved label directions is in compliance with CEQA. The Pesticide Use Enforcement Branch of CDPR has the authority to enforce the regulations adopted by CDPR. County agricultural commissioners are also charged with enforcing pesticide laws and regulations within their jurisdiction.

*Agricultural treatments in generally infested counties.* In counties where glassy-winged sharpshooter populations are widespread, pesticide treatment of commercial crops or commodities may be required for a number of reasons: 1) to ensure crops are free of glassy-winged sharpshooter prior to movement into uninfested parts of the state; 2) to protect the crop from damage by the pest; or 3) to protect adjacent susceptible crops. These treatments are standard agricultural practice and are the responsibility of the farm operator. The primary result of any mandate to commercial growers and nurserymen to treat for glassy-winged sharpshooter is a possible increase in the use of some pesticides at an economic cost to the grower.

*Treatments in urban and industrial areas.* The Pierce's Disease Control Program also includes provisions for application of chemical pesticides in non-agricultural areas. Under conditions described in the EIR, it may be necessary to apply chemical pesticides to urban and non-agricultural industrial properties harboring the glassy-winged sharpshooter to keep it from spreading to agricultural production areas. The authority for mandating such treatments is set out in the California Food and Agricultural Code, § 5401 et seq. These applications are to be done by professional pest control operators under the direction of local county agricultural commissioners' offices using pesticides approved by the US EPA and CDPR for residential and landscape use.

In contrast with pesticide applications confined to agricultural production areas, applications in urban and industrial areas provide the potential for individuals who ordinarily would not come in contact with post-application residues, to do so. Even though the materials selected for use are thoroughly examined by federal and state government regulatory agencies, and are in compliance with the California Environmental Quality Act, new issues arise with respect to private individuals, including freedom of choice, and personal views on pesticide use. For these reasons, additional information is provided here about pesticide materials that may be applied in non-agricultural production areas as part of the Pierce's Disease Control Program.

Based on past experience, questions most frequently asked about materials used in nonagricultural areas are: What is the chemical? What is its toxicity (how safe)? What kind of effects can it have on people, especially children, the elderly, and those with chronic illness? Will it affect the nervous system? Is it carcinogenic (cause cancer)? Will it affect pregnancy? Will it

harm pets? Will it affect beneficial insects, e.g., honeybees? What effect can it have on the environment, e.g., wild animals, livestock, birds, fish, and the ecosystem in general? What can I do to avoid possible harm?

In addition to the foregoing, some people are opposed to pesticide use, particularly in urban environments. Regardless of what studies have been done or what study results may or may not show, there is skepticism because pesticide chemicals cannot be guaranteed to not harm people or the environment (zero risk tolerance). As a practical matter, absolute certainty of no harm is not achievable. Only “reasonable assurance” of no harm can be provided.

In addition to specific chemical toxicity, there are individuals identified either as “chemically sensitive” or “chemically injured,” who have experienced adverse health events that they associate non-specifically with numerous chemical exposures.<sup>3</sup> There is no established mechanism or measurable biological marker that defines reactions reported by members of this group. The diagnosis as to cause is subjective. The reactivity of this group cannot be objectively evaluated because there are no objective criteria to apply to evaluate individual agents or to evaluate the individuals themselves. The issue is not toxicity, but a characteristic, apparently separate from any defined chemical, physiological, or pharmacological property. While this group of individuals may be impacted in some way by “pesticide application,” predictions of dire health consequences are not substantiated in the literature, individual claims notwithstanding.

There are hazards inherent to using any pesticide. Such hazards are not specific to the Pierce's Disease Control Program. Arguments against pesticide use as a general principle are not specific to the PDCP. The specter of “unknown” or “yet to be discovered” effects for which there is no unassailable way to respond, can always be raised, i.e., “risks are unknown.” Future discovery is not predictable. A standard of reasonable certainty of no harm has been adopted by regulatory agencies based on established test models and accepted test protocols.

As a general principle, whether or not toxicity occurs depends on how much of a material is absorbed. When testing chemicals for toxicity, the amount given to test animals is increased until effects are seen. If small amounts do not produce any effect, more is given. Whatever effect is seen is then documented as a “toxic effect.” Oftentimes people describing the toxicity of a chemical focus on the nature of reported effects and ignore the amount that must be given before effects will occur. Unless one is aware of how much must be given before adverse effects occur, people sometimes get the impression that toxic effects occur whenever someone comes in contact with the chemical, no matter how little or how much. This, of course, is not the case.

Two chemicals may both cause the same effect, but one may cause the effect at smaller amounts (dose) than the other. This is what is meant by “potency.” Sometimes it is referred to as which chemical is “stronger.” Many hazardous materials are used safely on a regular basis. For perspective, gasoline is toxic and hazardous, but it can be used safely. The same can be said for chemicals used in pest management. There is no doubt that, if not handled properly, hazardous

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<sup>3</sup> Idiopathic environmental intolerances. JACI, Vol. 103, January 1999, pp. 36-40  
<http://www.aaaai.org/professional/physicianreference/positionstatements/ps35.stm>

materials can be harmful. Safety is a matter of how one uses a material and is not a characteristic of the material.

In addition to directions for proper use, pesticide product labels are often required to provide precautionary statements. The US EPA prescribes specific precautionary language be placed on pesticide product labels. For example, a label may be required to say “may be harmful or fatal if swallowed” without any indication as to how much is needed before “harm” or “fatality” will result, or the nature of the harm. The intent is to tell people the product is not a food or beverage, and if one were to eat or drink it as it is supplied in the container, it could be hazardous to health. Unfortunately, labels would become unwieldy if a complete explanation were provided.

It is important for people to read and follow label directions. General precautionary statements, however, are not precise, and further detail is necessary to fully understand the nature of any associated hazard. The US EPA, as a matter of policy, chooses conservative language to alert consumers to potential hazards. Product labels address numerous potential uses and may include general information not applicable to every application circumstance. These general warnings are intended to advise product users as to possible outcomes if the product is not used in a safe manner, or in the event of an accident.

The following sections summarize scientific evaluations of some materials slated for use in urban environments for glassy-winged sharpshooter management. The discussions are not comprehensive or all inclusive. Additional materials may be selected for use in the Pierce's Disease Control Program as new information about effectiveness and efficiency emerge from ongoing research and evaluations. By law these materials will have to comply with all regulatory requirements, including satisfactory toxicity evaluations with reasonable assurance of no harm under proposed use conditions. The affected public will be notified and provided an opportunity to ask questions and comment about any materials that may be added to the program later.

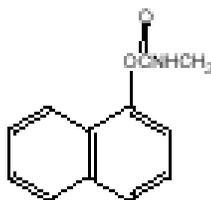
The following descriptions of pesticides used in the Pierce's Disease Control Program are based on evaluations done by the US EPA and CDPR, and rely on the conclusions of these agencies. Any disagreement with those conclusions is not a proper matter for evaluation in this EIR, but is within the purview of those agencies. This includes allegations of inadequate product testing, “inert” ingredient disclosure, and other expressed concerns that do not arise specifically in consequence to the Pierce's Disease Control Program, but apply to pesticide use in general. The discussions are focused on the materials as they may be used in the Pierce's Disease Control Program, and are not intended as comprehensive reviews on hazards that may attend other applications or misapplications.

# CHEMICALS

## -CARBARYL-

### BACKGROUND

Carbaryl is an N-methyl carbamate chemical. It was introduced as a general use, broad spectrum insecticide in 1956 and is used worldwide on fruits, vegetables, nuts, landscape plantings, pets, livestock, and human habitat to control insect pests. It is used for household as well as commercial pest management. It has the following chemical structure:



### TOXICOLOGY

#### General

Carbaryl acts by inhibiting a biological enzyme, acetyl cholinesterase. This enzyme is essential for the breakdown of acetylcholine, a chemical released at nerve endings that transmits nerve impulses. If acetylcholine is not destroyed after it is released, stimulation continues which leads to fatigue, exhaustion, and collapse.

Carbaryl is readily absorbed by all routes of exposure, i.e., through the skin, lungs (breathing), or by swallowing. It is rapidly metabolized and excreted, and does not store or accumulate in body tissues. Symptoms experienced when poisoning occurs vary, depending on the amount absorbed and the time period during which absorption takes place. A large amount absorbed in a short time may cause severe symptoms; however, small amounts absorbed over a prolonged time are unlikely to cause poisoning because of the rapid metabolism and excretion.

Symptoms of mild to moderate poisoning with carbaryl are common to many illnesses, including infectious diseases, allergic reactions, altered metabolic states, e.g., diabetes, malnutrition, and emotional reactions, e.g., anxiety, and are commonly described as “flu like.” Severe poisoning can lead to excessive secretions, edema (fluid) in the lungs, incoordination, convulsions, and death. Carbaryl poisoning does not occur unless a significant amount is absorbed. Recovery from non-lethal poisoning with carbaryl is ordinarily rapid with no residual effects.

## **Special Studies**

### ***CARCINOGENICITY*** (ability to cause cancer)

Carbaryl has been administered to both mice and rats in life-long feeding studies. In some of these studies, benign and malignant tumors have been noted. The incidence of tumors has been inconsistent. Because these findings are not predictable and are not consistently reproducible, scientists do not see carbaryl as being a probable carcinogenic risk. It is not listed as a known carcinogen on California's "Proposition 65" list.

### ***REPRODUCTIVE AND DEVELOPMENTAL TOXICITY***

Carbaryl has been tested in rodents, sheep, pigs, dogs and monkeys for effects on reproduction and fetal development. At extreme (artificially high) doses, toxic effects can occur in pregnant animals. Beagle dog pups born to mothers given carbaryl during pregnancy have exhibited malformations. While pregnant beagles did not show visible signs of toxicity, many had difficulty with labor and delivery. Effects on fetuses were inconsistent and not dose related, i.e., effects were seen at moderate doses more than at high doses. Lower doses had no effect. Based on these observations, the effect seen in beagle dogs is explained on the basis of toxicity in the mothers rather than an effect on the developing embryos.

Carbaryl is used in dog and cat flea collars. No increase in abnormalities in pups born to animals wearing these collars has been reported. Both the U.S. EPA and the California Department of Pesticide Regulation have determined that carbaryl, as used in pest management, does not present an increased risk of reproductive or developmental abnormalities to mammals, including humans.

### ***MUTAGENICITY***

A variety of tests is available to detect different kinds of damage to genetic components of living cells. Limited potential to affect genetic components in some of these tests has been seen with carbaryl, but results are inconsistent. No associated clinical findings have been observed that may evolve as a result of mutagenic changes in live test animals.

### ***NEUROTOXICITY***

Neurotoxicity can be divided into functional and anatomic components. Because carbaryl interferes with nerve function, it is a neurotoxin. This toxicity is reversible. As carbaryl is metabolized and excreted, normal nerve function returns.

Chemical damage or nerve injury is another type of neurotoxicity. Specific testing for nerve damaging effects has not been required for carbaryl since carbamate chemicals are not known to cause nerve damage. Nonetheless, several specific neurotoxicity tests have been conducted with carbaryl. There is no indication of nerve damage when carbaryl is given to laboratory animals for extended time periods.

### ***ALLERGY AND IMMUNOTOXICITY***

Carbaryl applied to the skin does not sensitize the skin to additional applications. There is no evidence of compromise to the immune system. There are studies in which tissue cells grown on

laboratory culture plates are more susceptible to viral invasion (“viral enhancement” effect) when carbaryl is added to the nutrient media. Animals given carbaryl in their diet for extended time periods do not have an increased incidence of infections.

## **BEHAVIOR IN THE ENVIRONMENT**

### **AIR**

Carbaryl has been detected in air during regular application (according to label) at concentrations up to 12 micrograms per cubic meter of air. Within six hours after application, concentration averages are generally less than 1 microgram per cubic meter of air. The workplace standard for carbaryl in air, where individuals may be exposed to daily average concentrations eight hours a day, five days a week based on a 40-year work expectancy, is up to 5 mg/m<sup>3</sup> (5,000 micrograms/m<sup>3</sup>).

### **GROUND**

Carbaryl residues measured in surface soil (top 1 inch) one day after carbaryl applications have reached 14.1 parts per million (ppm). The amount declines over time and does not accumulate. Amounts measured in individual samples are variable due to non-uniform distribution patterns and differences in soil types. The rate of breakdown varies with the soil type and environmental conditions, such as moisture content, acidity, temperature, the kind of microorganisms present, and the like.

### **WATER**

In one study conducted after carbaryl administration for glassy-winged sharpshooter, concentrations in runoff water after a rainstorm in an ordinarily dry creek bed approached 300 parts per billion (ppb). In a second area, there were three detections of carbaryl in surface water: 0.125 ppb from a water treatment basin; 6.94 ppb from a gold fish pond; and 1,737 ppb in a rain runoff sample collected from a storm drain adjacent to a sprayed site. This source exaggerates potential concentrations that may occur in aquatic systems after rain runoff, e.g., streams, creeks, or ponds. Contamination of ground water by carbaryl is not a known problem. Applying criteria based on water solubility and tendency to combine with soil particles, carbaryl is considered to be in mid-range with respect to leaching potential in soil.

### **PLANTS**

Carbaryl residue on leaves immediately after application is variable. Carbaryl residue measured on leaf surfaces after standard (according to label) application is generally less than 0.065 mg/inch<sup>2</sup>. Carbaryl residue on fruits and vegetables after treatment for glassy-winged sharpshooter did not exceed the limit of 10 parts per million set by the US EPA as a residue tolerance for these kinds of crops. Boston ivy, Virginia creeper, and maidenhair fern are reported to be damaged by carbaryl.

### **NON-TARGET ORGANISMS**

Temporary reduction of non-target insect populations may result from widespread application of carbaryl. Bees are impacted if they forage in treated areas. Carbaryl is very toxic to predacious

mites, and repeated application after short intervals has resulted in secondary outbreaks of mite pests.

Amphibian and reptile populations have not been adversely impacted in areas where carbaryl has been used in forests for gypsy moth control. Earthworm populations can be temporarily reduced. Birds are not adversely affected by carbaryl residues in the environment. Carbaryl has been applied to birds to control ectoparasites, similar to use on dogs and cats for fleas and ticks. Bird populations have been observed to migrate out of treated areas.

In fresh water, lake trout, yellow perch, and Coho salmon are most susceptible to carbaryl poisoning. In general, small and immature fish are more susceptible than large, more mature fish of the same species. Some aquatic insects are particularly susceptible to carbaryl. In New York, death of stoneflies, mayflies, caddisflies, and true flies was observed in streams in areas treated with carbaryl at one pound per acre.

### **NITROSOCARBARYL**

Carbaryl can chemically react with sodium nitrite, a common chemical, to form N-nitrosocarbaryl. The formation of nitroso compounds can occur naturally in the environment. Organic nitroso molecules are often associated with increased tumor incidence when they are administered to laboratory animals.

N-nitrosocarbaryl causes an increased incidence of tumors in laboratory animals. The formation of nitrosocarbaryl, however, requires specific conditions with respect to temperature, pH, concentration of both carbaryl and nitrite, etc. These conditions can be produced under laboratory conditions, however, despite a number of efforts directed toward measuring nitrosocarbaryl as a byproduct of carbaryl administration to laboratory animals or in the environment, the formation of nitrosocarbaryl has not been found to occur under normal physiological conditions. The administration of carbaryl itself to laboratory animals has not been associated with increased tumor occurrence.

### **HUMAN EXPERIENCE**

Carbaryl metabolites may be found in the urine of heavily exposed workers who have no symptoms. Carbaryl exposed workers had no measurable decrease in blood cholinesterase activity, an indicator of exposure, at estimated doses of 1.8 mg/kg per hour. Male volunteers eating daily doses of carbaryl up to 0.13 mg/kg had a temporary increase in amino acid nitrogen in their urine after six weeks of administration (an indication of possible impaired kidney function or altered metabolism of proteins). No symptoms were reported and the urine returned to normal when the administration of carbaryl was stopped. The California Department of Pesticide Regulation reports workers exposed to carbaryl having skin and eye irritations, and minor symptom episodes which resolved without treatment. There are reports in the medical literature in which individuals swallowed large amounts of carbaryl, either accidentally or intentionally, and died. Other seriously poisoned individuals have survived without persistent effects. Persistent effects, when they do occur, are associated with events which may occur during an acute toxic crisis, e.g., breathing problems that result in a lack of oxygen, which can lead to brain damage.

## **EXPOSURE CONSIDERATIONS**

Carbaryl is applied directly to plant foliage, usually at a concentration of 0.11 to 0.21 percent. The World Health Organization/Food and Agriculture Organization (WHO/FAO) jointly established an Allowable Daily Intake (ADI) for carbaryl of 0.01 mg/kg. Assuming a maximum anticipated concentration, a 10 kg (22-pound) child could consume the ADI by eating just over 12 inch<sup>2</sup> of freshly treated leaves daily. The ADI is based on a six fold uncertainty factor, meaning that this dose is about one-sixth the highest amount given to human volunteers at which effects did not occur.

## **SUMMARY**

Carbaryl is a commonly used home and garden insecticide. It has been in use for 45+ years to protect food crops, landscapes and animals from insect pests. It is effective against many insects when applied at a concentration of 0.11 to 0.21 percent in water. The concentration used and the rate of application varies according to prevailing circumstances, e.g., the pest, the crop, the surrounding environment, etc. Carbaryl is short lived in air, and residues on leaf and ground surfaces degrade rapidly, depending on environmental factors such as rainfall, temperature, soil conditions, etc. Residues resulting from standard applications do not pose an exceptional risk to the environment, including the human population. Repeated applications to an isolated area can lead to outbreaks of mite pests.

### **Selected References**

California Department of Pesticide Regulation(CDPR). Summary of Toxicology Data for Carbaryl. Revised 09/20/2000 Medical Toxicology Branch, Sacramento.  
<http://www.cdpr.ca.gov/docs/toxsums/pdfs/105.pdf>

California Department of Pesticide Regulation(CDPR).Environmental Fate of Carbaryl  
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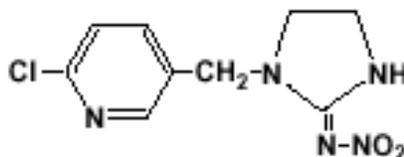
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## -IMIDACLOPRID-

### BACKGROUND

Imidacloprid belongs to a relatively new group of chemicals designated as neonicotinoids or chloronicotinyls. It was developed in 1985 and gained registration as a new pesticide active ingredient in the United States in 1994. In plants, it is a systemic agent, being absorbed by the plant when applied either to foliage (leaves) or to soil, where it is taken up by the root system. It is also used as a seed treatment. It is especially useful against insect pests that use their mouth to penetrate plant surfaces and suck out nutrients. Residue tolerances have been established for a number of crops, including cotton, hops, potatoes, apple pomace, grain crops, eggs, grapes, fruiting vegetables and others. (Code of Federal Regulations 40, §180.472). It is also marketed as a flea treatment for cats and dogs. It has the following chemical structure:



### TOXICOLOGY

#### General

Imidacloprid interferes with nerve transmission in insects, acting at nerve receptors designated as nicotinic or nicotinergeric receptors. These receptors are more numerous in insects than mammals rendering insects more vulnerable. It is effective at relatively low application rates, and post application residues are relatively low compared with other topically applied materials.

In mammals, it is readily absorbed if swallowed, and is rapidly metabolized and excreted. It does not store or accumulate in body tissues. It is considered moderately toxic if swallowed, but only slightly toxic if contact is with the skin or by breathing in dusts or aerosols. No reports of human poisoning were found (December 2001).

#### Special Studies

#### *CARCINOGENICITY*

Standard tests in laboratory animals have not associated imidacloprid administration with tumor development. The United States Environmental Protection Agency (US EPA) has placed imidacloprid in Group E for carcinogenicity: "No evidence of carcinogenicity for humans." Imidacloprid is not listed as a known carcinogen on California's "Proposition 65" list.

#### REPRODUCTIVE AND DEVELOPMENTAL TOXICITY

Studies on rats and rabbits do not show any significant potential for reproductive or developmental abnormalities when imidacloprid is administered during vulnerable periods in the reproductive cycle.

### ***MUTAGENICITY***

A variety of tests is available to look for damage to genetic components of living cells. Some of these tests have been positive for genetic disruption with imidacloprid. Thus, there is evidence of weak mutagenic activity, however, imidacloprid is not demonstrated to be a hazard in this regard.

### ***NEUROTOXICITY***

Neurotoxicity can be divided into functional and anatomic components. Because imidacloprid interferes with nerve function, it is a “neurotoxin.” Chemical damage or injury to nerves is another type of neurotoxicity. Specific testing for nerve damage has not been required for imidacloprid. There is no clinical evidence of nerve damage in laboratory animals given imidacloprid for extended time periods.

### ***ALLERGY AND IMMUNOTOXICITY***

Imidacloprid applied to the skin does not sensitize the skin to additional applications. There is no evidence of compromise to the immune system.

### **BEHAVIOR IN THE ENVIRONMENT**

#### **AIR**

Imidacloprid has a very low vapor pressure and therefore a limited potential for volatilization (evaporation). Only limited environmental data are available for imidacloprid. Imidacloprid was not detected in air samples from an application area where the material was applied at a concentration of 0.3% in water to treat for a glassy-winged sharpshooter infestation.

#### **SOIL**

Studies of imidacloprid in soils indicate a half-life ranging from one to seven-plus months. The rate of disappearance depends on prevailing environmental conditions which include soil type, moisture content, acidity, microbial population, temperature, sunlight, and the like. After a single application to soil of a 0.09 percent solution for glassy-winged sharpshooter, reported by the California Department of Pesticide Regulation, imidacloprid concentration ranged from 2.95 to 46.4 parts per million. Such a range of concentrations is to be expected, based on spot sampling since application is not entirely uniform over the soil surface.

#### **WATER**

Imidacloprid is moderately soluble in water, and has a moderate tendency to bind to organic material. This combination limits its ability to leach or percolate into groundwater. It could move through more porous soils lacking organic content, and is therefore on CDPR’s groundwater protection list under CCR Title 3, Section 6800(b). Studies of imidacloprid residues in water show it to be relatively stable, with a half-life greater than 30 days in acid or neutral water, but “less” in more alkaline media. No reports of degradation in stream or pond environments were identified. After foliar application for glassy-winged sharpshooter, residue in runoff water was detected at approximately 80 parts per billion. This water was collected from storm drains after sprinkler and rain irrigation shortly after an application for glassy-winged sharpshooter. This

sampling exaggerates potential concentrations that may occur in aquatic systems after rain runoff, e.g., streams, creeks, or ponds, and provides an extreme-case example.

## PLANTS

Imidacloprid residue on leaves immediately after application is variable. Limited residue data have been collected after foliar applications for glassy-winged sharpshooter. One study reported slightly less than 2 micrograms of imidacloprid per square centimeter of leaf surface (12.9 micrograms per square inch).

## EFFECTS ON NON-TARGET ORGANISMS

Temporary reduction of non-target insect populations may result from foliar application of imidacloprid, less so with soil application. Honeybees are susceptible, and temporary population reductions may occur in areas of widespread application. Reports from France tell of bee population reductions in areas where sunflowers were grown from imidacloprid treated seeds, although it is controversial as to whether or not these events are related.

Fish are moderately impacted by imidacloprid in laboratory tests. No field studies of fish were reported. Aquatic invertebrates may be adversely affected, based on imidacloprid's known effects on other insects at relatively low concentrations.

Imidacloprid is applied to dogs and cats to kill fleas. Birds feeding on seeds treated with imidacloprid have been observed to retch and stagger about. They subsequently show an aversion to eating treated seeds, and imidacloprid has been considered for use as a seed treatment to repel birds. Some bird species are susceptible to toxic effects from imidacloprid more than others. No field reports of bird mortality were found. (December 2001)

## EXPOSURE CONSIDERATIONS

Imidacloprid has been applied to plant foliage at a concentration of 0.3 percent, and as a soil drench at 0.09 percent to control glassy-winged sharpshooter. The amount of imidacloprid potentially present at any given time in drainage system water is variable, inconsistent and temporary. No instances of poisoning as a result of humans or animals drinking from drainage water containing residues of imidacloprid has been reported. Likewise, no reports of significant impacts on aquatic life forms as a consequence of contamination have been reported.

The US EPA has set a reference dose ( $R_fD$ ) for imidacloprid at 0.057 mg/kg/day. If a leaf has 12.9  $\mu\text{g}/\text{in}^2$ , a 22 pound child would need to consume 44  $\text{in}^2$  of treated leaves daily to equal the  $R_fD$ . The  $R_fD$  is 100 times less than a minimal dose needed to cause a noticeable effect in test animals.

## HUMAN EXPOSURE EXPERIENCE

No incidents of human poisoning were found, however, according to DPR records, a number of exposure incidents have been reported in which workers exposed to imidacloprid had coincidental, nonspecific symptoms, e.g., headache, upset stomach, rash, etc. In almost all cases, exposure history included multiple chemicals, and a relationship between symptoms and

exposure was uncertain. Minor eye irritation was reported when imidacloprid-containing material was splashed directly into a person's eye.

## **SUMMARY**

Imidacloprid is a relatively new insecticide. It is absorbed into plants, and may be applied to plant foliage, to soil as a drench, by injection, or as a seed treatment. It is used to protect food crops, landscapes, and animals from insect pests, particularly those that penetrate plant surfaces and suck out nutrients. The concentration used and the rate of application may vary according to the specific circumstances of application, i.e., the pest, the crop, the surrounding environment, etc. Imidacloprid presents a low toxicity hazard to mammals, and because it is absorbed into plants, tends to be less available to non-target surface insects. It may impact beneficial organisms such as honeybees, especially if applied to foliage, but less so when applied to soil for uptake by plant roots. Because it is relatively new, only a limited number of crop residue tolerances have been established, which may limit availability in some settings for use against glassy-winged sharpshooter infestations. Additional crop residue tolerances may be issued as more data are gathered from additional crops.

## **Selected References**

California Department of Pesticide Regulation(CDPR). Summary of Toxicology Data for Imidacloprid. Revised 05/16/94, Medical Toxicology Branch, Sacramento.  
<http://www.cdpr.ca.gov/docs/toxsums/pdfs/3849.pdf>

California Department of Pesticide Regulation(CDPR).Environmental Fate of Imidacloprid.  
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California Department of Pesticide Regulation(CDPR). Glassy-Winged Sharpshooter Project.  
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EXTOXNET – Imidacloprid. <http://ace.orst.edu/cgi-bin/mfs/01/pips/imidaclo.htm>

## **-PYRETHROID COMPOUNDS-**

### **BACKGROUND**

Pyrethroid compounds are derived from pyrethrins which occur naturally in chrysanthemum flowers. Naturally occurring pyrethrins are unstable in sunlight and have limited potency. In order to improve the stability and potency of pyrethrins, modifications to the basic molecule have been carried out. The result is the class of compounds known as pyrethroids.

Pyrethroid compounds have been used since the 1940s to control insects in both agriculture and around residences. Some pyrethroids are used to treat humans for lice. Others are used on pets for fleas and ticks. They are used for mosquito and fly control, cockroaches, poultry houses, on stored grain, and for general insect management. More potent or hazardous pyrethroids may be restricted to use by professional pesticide applicators. A wide range of compounds is available for use under varying circumstances and conditions. Insect resistance to pyrethroid compounds is common. Some insects are able to produce enzymes that break down pyrethroid molecules. When this happens, new modifications are made to overcome the insect resistance.

### **TOXICOLOGY**

#### **General**

Pyrethroid compounds disrupt normal nerve action by interfering with nerve cell function, preventing the normal exchange of essential materials across cell membranes. This initially results in excess stimulation, followed by depression.

In mammals, most pyrethroid compounds are not rapidly absorbed, but they are rapidly metabolized and excreted. They do not accumulate or store in body tissues. They are moderately toxic if swallowed, but only slightly toxic if contact is with the skin. Breathing in dusts or aerosols containing pyrethroid compounds can result in symptoms, depending on the particular material and how much is in the air. Many aerosol insect sprays available for home use contain pyrethroid compounds.

If ingested (swallowed) in concentrated amounts, pyrethroids can be fatal. In such cases, symptoms of gastric upset and central nervous system disruption are reported to occur. Nausea, vomiting, cramps, confusion, weakness, loss of consciousness, and sometimes seizures have been reported.

Pyrethroids are known for producing skin sensations (paresthesias). The mechanism by which this occurs remains uncertain. Descriptions include tingling, itching, prickling, burning, and numbness. Facial sensations are often noted. The sensations may or may not be accompanied by a rash, but inflammation is usually not present. Overall, the sensations are described as “unpleasant but not harmful.” Most often the sensations resolve within a day, although cases of symptoms lasting for several weeks have been recorded. The mechanism for the development of these symptoms does not appear to be allergic in nature, however, susceptible individuals may separately develop typical allergic reactions to pyrethroid compounds.

## **Special Studies**

### ***CARCINOGENICITY***

Standard tests in laboratory animals do not suggest that pyrethroid compounds, as a group, cause an increase in the incidence of tumors. The possibility that individual agents may have capabilities independent of the rest of a class of compounds exists, and for this reason carcinogenicity testing is required for each new modification (pyrethroid compound).

### ***REPRODUCTIVE AND DEVELOPMENTAL TOXICITY***

Pyrethroid compounds have not been associated with reproductive or developmental toxicity, except at extreme doses. Even at extreme challenge doses, reported effects are limited to findings such as reduced weight or size of offspring. Each individual compound must be tested for reproductive and developmental toxicity before being registered by the US EPA or CDPR for use as a pesticide.

### ***MUTAGENICITY***

A variety of tests is available to look for damage to genetic components of living cells. A search of the general literature on pyrethroids did not reveal information relating to mutagenicity of these compounds as a class. Review of California Department of Pesticide Regulation Toxicity Summaries for selected pyrethroid compounds shows that mutagenicity testing is required and that registered pyrethroid compounds do not have a tendency to cause mutagenic effects.

### ***NEUROTOXICITY***

Neurotoxicity can be divided into functional and anatomic components. Because pyrethroids interfere with nerve function, they are “neurotoxic.” Chemical damage or injury to nerves is another type of neurotoxicity. Specific testing for nerve damage has not been required for pyrethroids. There is no clinical evidence of nerve damage in laboratory animals when pyrethroid compounds are given for extended time periods.

### ***ALLERGY AND IMMUNOTOXICITY***

Pyrethroid compounds can be allergenic. There is no information to suggest that these compounds interfere with immune system function. The mechanism by which an allergic reaction occurs is unrelated to toxicity. Allergy is a person’s immune system reacting to what it identifies as a foreign substance entering the system, the same as it does in response to microorganisms that cause infections.

## **BEHAVIOR IN THE ENVIRONMENT**

### **AIR**

Pyrethroids as a group have a relatively low vapor pressure. They are not prone to evaporate or volatilize. When incorporated into home-use pressurized spray containers, they remain in the air within mist droplets. They stay with the droplets and settle along with the droplets. “Foggers” (very fine mist) are also used to disperse pyrethroids into the air. When applied in material that does not remain airborne, pyrethroids do not remain in the air for extended periods of time.

## SOIL

There is a wide range of soil half-lives for the pyrethroid compounds. Depending on the individual compound, half-lives have been measured from weeks, to as long as 11 or more months. The rate of disappearance depends on prevailing environmental conditions which include soil type, moisture content, acidity, microbial population, temperature, sunlight, and the like. Pyrethroids bind to soil and organic materials, and are not very water soluble. This combination makes leaching or percolating to groundwater unlikely. Because many are tightly bound to soil and organic matter, even though they are not very water soluble, soil erosion into surface water with water runoff is possible.

## WATER

Pyrethroids are rather stable in water and resist photolysis (breakdown by sunlight) and hydrolysis (breakdown reaction with water). In water, it has been shown that persistence is contributed to by soil sediments that bind with the pyrethroids and are suspended in the water.

## PLANTS

Pyrethroids are metabolized by plants. The breakdown rate depends on the plant and the individual compound. Applied to foliage, breakdown is generally in the range of one to two weeks. Applied to tree bark for beetles, some compounds have remained active for two months. Pyrethroids are not known to be absorbed into plants (systemic uptake), but they can be adsorbed (adhere) onto leaf surfaces, which reduces the amount that can be dislodged (wiped off), thereby remaining available against insect pests that eat treated foliage.

## EFFECTS ON NON-TARGET ORGANISMS

As with other broad spectrum insecticides, temporary reduction of non-target insect populations, including honeybees, may occur with widespread application of pyrethroids. Aquatic organisms are very susceptible to poisoning by pyrethroids. Pyrethroids can accumulate in fish. Organisms that filter sediment are particularly susceptible. Birds and mammals are not particularly at risk inasmuch as they rapidly metabolize and excrete these compounds.

## EXPOSURE CONSIDERATIONS

The US EPA has set reference doses ( $R_fDs$ ) for individual pyrethroid compounds, and set residue limits for food crops. As a practical matter, application of a pyrethroid three to six times a year for glassy-winged sharpshooter management will not contribute substantially to the amount individuals may receive on a chronic basis over their lifetime. Applied according to approved labeling, there is a reasonable certainty of no harm.

## HUMAN EXPOSURE EXPERIENCE

Because pyrethroid compounds have been used extensively over several decades, incidents of human poisoning, both fatal and nonfatal, have been reported. Fatalities have followed ingestion (swallowing) of various amounts of concentrated products, often containing other toxic agents as well. These cases are mostly deliberate acts, although some are accidental (i.e., the individual didn't know what was in the "drink" container). Individuals who have developed major symptoms, including seizures and severe nervous system disruption who survived, are reported to

recover without any residual injury. The most frequent reported symptoms from exposure are skin and facial sensations as discussed under General Toxicology.

## **SUMMARY**

Pyrethroid compounds are derived from pyrethrins which occur naturally in some plants, particularly chrysanthemums. Their insecticidal activity comes from interference with insect nerve function. Pyrethroid compounds are not well absorbed by mammals, including humans, and are rapidly metabolized, thereby limiting their impact on these species. They are not known to be carcinogenic or to cause reproductive harm. There is no evidence to suggest damage to nerves. Their primary affect on humans is to cause unpleasant, but not harmful, skin and facial sensations, although if swallowed in concentrated amounts, they can be fatal. Aquatic organisms are quite sensitive to pyrethroid compounds. Pyrethroids are poorly water soluble, and adhere to soil and organic matter, which limits their ability to reach ground water supplies. They are not very volatile and do not concentrate in air unless incorporated into mists or fogs. Pyrethroids have been used in agriculture for general insect control, and have many applications including application to humans for lice, dogs and cats for fleas, poultry houses for ectoparasite and fly control, in homes for house pests such as the common house fly, mosquito control, and others. A variety of pyrethroid compounds with a wide range of potencies is available for use. While some can be used safely by homeowners, others may be restricted to use by professional applicators. Some use restrictions relate to environmental concerns, e.g., hazard to aquatic organisms, rather than human health concerns.

## **Selected References**

California Department of Pesticide Regulation(CDPR). List of Toxicology Summaries.  
<http://www.cdpr.ca.gov/docs/toxsums/toxsumlist.htm>

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FIFRA Scientific Advisory Panel Meetings Held in 1999; Environmental Fate Assessment for the Synthetic Pyrethroids. <http://www.epa.gov/scipoly/sap/1999/february/pyreth.pdf>

## "Inert" Ingredients and Impurities

The term "inert" when applied to an ingredient in a pesticide product only refers to pesticidal properties. It is not intended to suggest that the ingredient is without chemical activity or toxicity. An "inert" ingredient in a pesticide may have hazardous properties even though it is not pesticidal. Nonpesticidal ingredients are added to pesticide products to enhance or aid the product's physical characteristics, utility, or its stability.

A "filler" ordinarily provides bulk to achieve a desired concentration or volume. Water, clay, ground-up corncobs, and similar materials are frequently used as fillers.

Solvents are another potentially major product ingredient. Solvents are necessary to dissolve some materials. Water can be a solvent, as can petroleum distillates or other organically derived liquids.

Other ingredients may be added as product stabilizers, emulsifiers, surfactants, and preservatives. These chemicals usually are present in low concentrations. They are not unique to pesticide products. The same chemicals may be found in a variety of other consumer products ranging from processed foods, cosmetics, and pharmaceuticals to household cleansers and similar products.

In addition to formulation ingredients, impurities may also be present. Impurities can be byproducts of chemical manufacturing or background contaminants found throughout the environment. The contribution of impurities to product toxicity is accounted for in routine testing, because they are present when toxicity tests are done. The end product of chemical manufacturing is often referred to as "technical grade" material. This indicates that not all impurities have been removed. Manufacturers are required to meet product quality control standards to assure that their product contains the stated label concentration and that specified contaminant levels are not exceeded.

Companies formulating pesticide products often do not know the precise chemical composition of ingredients they purchase from other suppliers. The supplier's product is not a pesticide and therefore not subject to pesticide testing requirements. Pesticide manufacturers test the acute toxicity of their final product, but are not required to test each ingredient to the same extent required for pesticide active ingredients. Pesticide manufacturers and formulators, perhaps justifiably, do not want to be singled out and required to develop toxicity data for products they use, when many other unidentified users can use the same ingredients in household and industrial products without comparable toxicity data being required.

The U.S. EPA has grouped inert ingredients in pesticide products into four categories: 1) Inerts of toxicological concern; 2) Potentially toxic inerts, with high priority for testing; 3) Inerts of unknown toxicity; and 4) Inerts of minimal concern (54 FR 48314). Products containing inert ingredients of toxicological concern must be labeled, "This product contains the toxic inert ingredient (*name of inert*)."

The use of inert ingredients with the least toxic potential is encouraged. Crop residue tolerances are not established for many inert ingredients found in

pesticide products. Many of these are classified as **Generally Recognized As Safe (GRAS)**. Examples of ingredients with this designation include table salt, water, corn meal, vinegar, starch, etc.

Only products registered by both the U.S. EPA and CDPR are used in pest control and/or eradication projects in California. The formulation ingredients of individual products may vary. Products considered for use in eradication projects are screened for inert ingredients of concern and, whenever practicable, products without inerts of toxicological concern are used.

# Potential Impacts of Using Pesticides as Described to Combat Glassy-winged Sharpshooter Infestations

In the Pierce's Disease Control Program, pesticides are applied to the foliage of trees and shrubs, or to soil immediately below trees and shrubs, using ground application equipment in residential settings. Commercial agricultural crops may be treated by aerial application if this is a standard application practice for the area. Open areas, such as grassy areas or open fields, are not targeted for treatment. After application, "exposure" is primarily through skin contact with foliage or water runoff after rain or irrigation. The potential for pesticide residues in the air is insignificant as has been verified through monitoring of the environment before, during, and after applications.

Following the prescribed Pierce's disease treatment protocol for glassy-winged sharpshooter management, there are no forecast adverse impacts to fish or wildlife populations. There is no direct application to water bodies. The potential for localized off-site runoff into surface waters hosting susceptible aquatic life forms is limited, both as to amount and frequency. Special precautions are incorporated into the program to protect identified threatened or endangered species habitat. Because locations for residential applications and nonagricultural industrial areas will be scattered, the chance of temporary spot impacts exists should an unusual runoff experience or spill event occur, but these will be temporary and limited as to area. These events are incidental, and although the possibility is known, and avoidance measures observed, absolute avoidance cannot be assured. Drainage from agricultural production areas where myriad materials are commonly used will not be notably impacted by program pesticide uses. Identification of threatened and endangered species habitat calls for maximum avoidance actions. Proper mitigation measures incorporated into the treatment protocol minimize the potential for adverse impacts. Based on laboratory testing and past experiences spanning a period of time from years to decades, post application residue amounts from applications as outlined for glassy-winged sharpshooter are not known to adversely impact rodents, birds, dogs, cats, and myriad wildlife species.

Beneficial insect populations in treatment areas may be impacted. Honeybees foraging in a treatment area can be killed, as can some predacious mite species that help control pest mites. Other beneficial or desirable species may also suffer temporary population reductions, e.g., ladybird beetles, butterflies, lacewings, etc. Provisions to notify commercial bee keepers will enable them to take protective action. Despite precautions, wild bee populations in treatment areas may suffer temporary reductions. Repopulation from surrounding areas occurs when treatments cease. Should chemical pesticide treatments be required in commercial crops where integrated pest management (IPM) practices rely on the presence of beneficial insect populations, e.g., some citrus orchards, disruptive impacts may be experienced. If existing populations of beneficial insects are drastically altered, commercial growers may find it necessary to increase the use of pesticide chemicals in the future to combat pests other than glassy-winged sharpshooter. Such disruption in an established IPM program may lead to economic losses. Best pest management practices by individual growers may reduce or mitigate impacts on established integrated pest management programs.

Following the prescribed protocol for pesticide applications in the Pierce's Disease Control Program, no adverse impacts are foreseeable for human health. The amount of residue on surfaces after application do not exceed limits established by pesticide regulatory agencies. For commercial crop applications, pre-harvest intervals and crop residue tolerances are established and must be complied with. Individuals who feel a need to vacate areas of application, regardless of demonstrated toxicity, allergy, or individual reactivity, are to be notified prior to application. Undoubtedly, some individuals will experience discomfort (e.g., apprehension, anxiety, aversion, etc.), and behavior may be impacted depending on individual disposition and perceptions, however reactive behavior is not environmentally caused, although it may lead to secondary impacts depending on the individual or group. These impacts are of social origin, rather than an inherent property of the program or selected pesticide materials.

**Notable Populations and Distinctive Locations:** Some populations receive special attention based on health or developmental status, e.g., presence of acute or chronic illness, extremely young or old age, pregnancy, etc. Because of their comparatively frail nature, individuals within these populations are oftentimes more prone to health complications, such as infectious diseases, trauma, nutritional deficiencies, etc. Certain locations are noted for the populations that come together there, such as parks, recreation areas, sports arenas, hospitals, day care centers, and schools. The question often asked is: What special precautions will be taken to protect these “sensitive” areas?

Toxicity is related to dose. Exposure (dose potential) depends on the amount of material present and activities that bring people into contact with it. One could mathematically calculate theoretical exposure scenarios and absorption amounts for individuals under specified exposure circumstances, e.g., rolling on soil, drinking runoff water after rain, eating leaves with residue, etc., and develop dose estimates. This has been done in the past. These estimates provide a basis for assessing the potential for persons engaged in the examined activities to absorb enough material to cause toxicity. They do not, however, provide any reliable information as to how often or how many individuals engage in the activities upon which the dose estimates are based. The U.S. EPA has been given a mandate from Congress to develop risk assessment procedures under the Food Quality Protection Act (FQPA) that take into consideration all sources of exposure. This is an extremely complex task and methodologies are yet to be developed.

Perhaps the first question to ask is: Does the application of pesticide chemicals to trees and shrubs around hospitals, nursing homes, and adult care centers pose a special risk to those who reside, work, or visit there? Projections used to estimate risk assume maximum exposure which supposes activity patterns that would bring individuals into contact with treated surfaces. People at medical care facilities and facilities that provide adult support services do not engage in behavior that would bring them into extensive contact with treated vegetation. At the time of application, residents, employees, and visitors at these facilities are not exposed to excessive amounts. This has been verified through environmental monitoring. Exposure is minimal. In establishing reference doses, regulatory agencies include conservative (protective) uncertainty factors that take into account variation in individual susceptibility. Thus, frail populations, i.e.,

those whose health is not optimum, are not more likely to suffer adverse impacts from pesticide applications provided for in the Pierce's Disease Control Program.

School environments receive special attention when it comes to pesticide use. A number of states have passed legislation requiring special procedures and notifications when pesticides are used on school grounds, and individual school districts may have separate policies which address pesticide use on school property. As a practical matter, should it be determined that treatment of a school ground is necessary for glassy-winged sharpshooter management, timing would be such as to avoid applications when school was in session or special activities are scheduled.

Physiologically, existing data do not suggest children are substantially more susceptible to chemical injury than are physically mature individuals, although there are exceptions related to specific chemicals. In some cases, children actually show increased, rather than decreased tolerance to some chemicals compared with mature individuals. That aside, the question remains: Are children at school at increased exposure risk, and thereby increased risk of adverse health effects if pesticide chemicals are applied to trees and shrubs on school grounds as provided for in the Pierce's Disease Control Program?

The characteristic of active children that predisposes them to proportionately greater exposure is behavior. Time spent in classrooms does not contribute to greater exposure. What is the likelihood that school aged children will spend extensive or prolonged time in contact with treated foliage on school grounds? Activities that would bring them in contact with treated foliage may include playing "hide-and-seek" or swinging around a tree, etc. Landscape plantings around schools generally do not serve as recreational apparatus. School aged children are more likely than adults to physically contact plantings, but are not likely to ingest foliage, or have prolonged contact such as may be associated with gardening. The amount of residue remaining on foliage after application of chemicals for glassy-winged sharpshooter management is no greater than what is considered safe for use by private individuals for home pest management. Schools also may instruct children to avoid treated plantings when on the playground. The amount of residue children at school may come in contact with would not present an inordinate risk of adverse health consequences i.e., there is reasonable assurance of no harm.

Day care centers offer the same exposure potential for children as private homes or school grounds. The younger age of the children is notoriously associated with greater "exploration." This age requires closer supervision wherever they are. It is only when children are outdoors that extra effort may be needed to discourage younger children from contact with treated foliage. It is behavior that results in proportionately greater exposure potential rather than an increased toxicity potential for these individuals. In these settings, teachers and supervisors may wish to confine children to areas not immediately adjacent to landscape foliage to facilitate closer supervision. Time spent at the facility does not contribute to exposure unless a proportionately greater amount of time is spent in contact with treated foliage.

Because pesticide applications are to be directed onto trees and shrubs, and not as a cover spray to open areas, exposure of visitors to parks and recreation areas is limited to activities that would put visitors in contact with treated foliage. Simply visiting a park would not provide exposure

different from residential property exposure. Visitors to these areas may be advised by posted signs that treatment has taken place. Recreational activities that could bring participants regularly into contact with treated plants are limited. Younger children are more likely to “engage” plantings as they play and explore. It is these activities that provide direct exposure. Treatments are limited as to frequency and amount. Thus, parks and recreation areas are not special risk environments.

The Pierce's Disease Control Program has considered and responded to environmental concerns. Significant environmental impacts are not predicted or anticipated as a consequence of pesticide use as proposed, with the possible exception of temporary reduction of some beneficial insect populations.



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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX Q**

**INITIAL DECISION TO USE CARBARYL IN THE URBAN / RESIDENTIAL  
TREATMENT PROGRAM AGAINST GLASSY-WINGED SHARPSHOOTER  
AND  
SELECTION CRITERIA FOR INSECTICIDES FOR USE IN THE PROGRAM**

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## **Initial Decision to Use Carbaryl in the Urban/Residential Spray Program**

On June 1, 2000, the CDFA convened a conference call of its Science Advisory Panel (SAP) to discuss the newly discovered glassy-winged sharpshooter infestation in Porterville, Tulare County. The SAP was apprised of the situation in Porterville. In earlier meetings, the SAP had reviewed treatment options for the sharpshooter and concurred that chemical insecticides were the only known effective control option for the pest. In light of the urgent need to slow the spread of the pest, SAP concurred that a rapid response consisting of a treatment program using chemical pesticides was needed. When asked by CDFA to identify insecticides that were known or believed to be effective against the glassy-winged sharpshooter, SAP members noted that most organophosphate, carbamate, and pyrethroid insecticides should work. Specific materials mentioned were chlorpyrifos, cyfluthrin, and carbaryl.

Recognizing the need for immediate action against the pest, CDFA staff evaluated the recommendations of the SAP, using the following criteria:

- 1) Was the material likely or known to be effective against the glassy-winged sharpshooter?
- 2) Was it registered for use in urban/residential settings in California?
- 3) Was it registered for use on the broad range of ornamental and food plants likely to be encountered in urban/residential settings in California?
- 4) Did CDFA have any field experience with the use of the material from past pest prevention projects?
- 5) Was the material readily available in the amounts necessary to treat a large urban area?

Based on these criteria, the CDFA selected carbaryl for use in Porterville. The key factors in the decision included:

- i) Carbaryl had been recommended by the SAP.
- ii) Carbaryl was registered for use in urban/residential settings in California.
- iii) Carbaryl had the broadest range of ornamental and food crop uses on its label.
- iv) CDFA had used carbaryl in a similar treatment program against the Japanese beetle program and clearly understood operational limitations on its use (such as the potential for phytotoxicity on plants if applied when air temperatures are too hot.)
- v) The toxicological and environmental aspects of similar foliar applications of carbaryl had been reviewed in an Environmental Impact Report produced by the CDFA for its gypsy moth program (Final Environmental Impact Report Gypsy Moth, *Lymantria dispar* (L.) Eradication Program in California State Clearinghouse Number 90021090)
- vi) Carbaryl was readily available in sufficient quantities.

## **Selection Criteria for Insecticides for Use in the Program**

Because carbaryl was the first material used in the PDCP program, it became the “benchmark” against which all other materials discussed herein are compared for inclusion into the urban/residential portion of the program (Figure 1). The CDEFA has reviewed a large number of insecticides registered for use in urban/residential settings in California (Table 1) for their potential use in the PDCP.

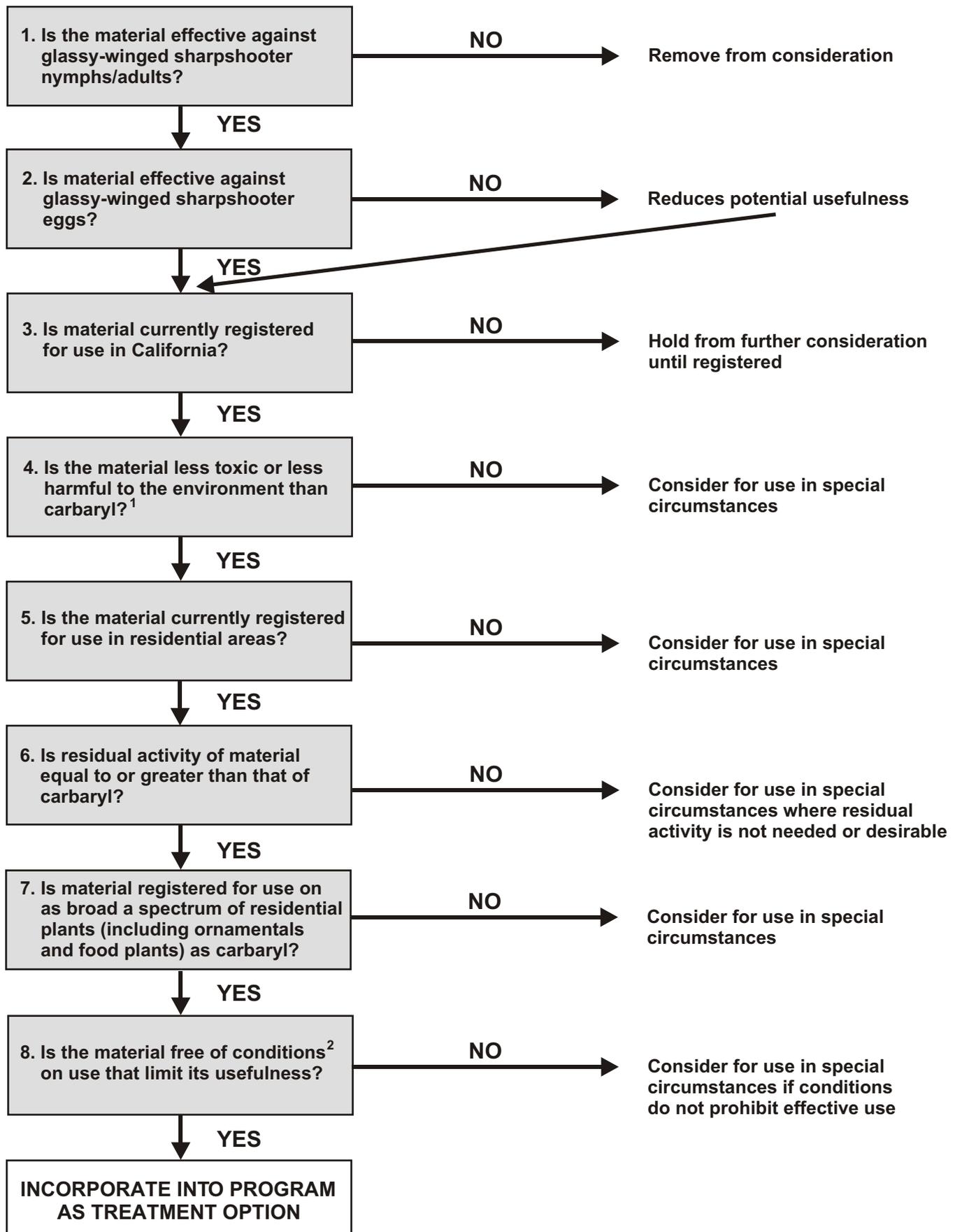
Although much information--especially about effectiveness against GWSS--is missing, the data are sufficient to determine which products merit further review (Farm Chemicals Handbook, CDPR Data Base of Pesticide Labels, <http://www.cdpr.ca.gov>). A number of materials were eliminated from further consideration, as discussed below.

All the registered materials in Table 1 can be and have been used safely in urban/residential settings. Those eliminated from further consideration have been shown to lack efficacy against the glassy-winged sharpshooter, have operational limitations that render them ineffective or inappropriate for use in this Program, or they do not meet the criteria that the program result in the least harm to public health and the environment, including the application of the least toxic pesticide than carbaryl when directly compared to that benchmark material.<sup>1</sup> In many cases, the materials have a toxicity profile similar to carbaryl but they are NOT less toxic and do not cause less possible harm to public health and the environment than carbaryl, and thus they have been removed from consideration for use. Table 3 lists those materials that might be considered for use in residential/urban settings in the PDCP.

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<sup>1</sup> California Department of Finance, *State of California 2000-01 Final Budget Summary*.

Figure 1: CDFA Treatment Selection Process



<sup>1</sup> Include considerations of: human, vertebrate, and non-target arthropod toxicity; potential ground water contamination; secondary pest outbreak potential; phytotoxicity, etc.

<sup>2</sup> Includes: burning of treated plants if applied when temperatures exceed those listed on label, may not be applied to food crops, must be applied only by licensed applicators, etc.

Table 1. Materials Evaluated for Use in Urban/Residential Settings

Active ingredient	Effective against GWSS <sup>1</sup>	Registered in CA	Registered for use in residential settings	Residual activity equal to or greater than carbaryl	Use pattern as broad as carbaryl	Use conditions that might limit effectiveness <sup>2</sup>	Less toxic and causes less possible harm to public health and environment than carbaryl <sup>3</sup>
Carbaryl	Yes	Yes	Yes	-----	-----	Can cause phytotoxicity if applied when air temperatures are too high	-----
Acephate	Somewhat	Yes	Yes				
Acetamiprid	Yes	No	No				
Aldicarb	?	Yes	Yes				No
Allethrin	?	Yes	Yes				
Aluminum phosphide	?	Yes	Yes			Fumigant only	No
Avermectin	<b>No</b>	Yes	Yes				
Azinphos-methyl	?	Yes	Yes				No
<i>Bacillus thuringiensis</i>	<b>No</b>	Yes	Yes			Effective only against Lepidoptera	
<i>Beauveria bassiana</i>	unlikely	Yes	Yes			Sensitive to low relative humidity	
Bifenthrin	Yes	Yes	Yes				
Chlorpyrifos	Yes	Yes	Yes				<b>No</b>
Cinnamaldehyde	?	Yes	Yes				
Cryolite	No	Yes	Yes			Stomach poison only ingest by chewing treated leaves	
Cyfluthrin	Yes	Yes	Yes				
Lamda cyhalothren	?	Yes	Yes				
Cypermethrin	?	Yes	Yes				
Cyromazine	?	Yes	Yes				
Deltamethrin	Yes	Yes	Yes				
Diatomaceous							

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Active ingredient	Effective against GWSS <sup>1</sup>	Registered in CA	Registered for use in residential settings	Residual activity equal to or greater than carbaryl	Use pattern as broad as carbaryl	Use conditions that might limit effectiveness <sup>2</sup>	Less toxic and causes less possible harm to public health and environment than carbaryl <sup>3</sup>
earth	?	Yes	Yes				
Diazinon	?	Yes	Yes				No
Dimethoate	Yes	Yes	Yes				No
Dimilin	?	Yes	Yes				
Disulfoton	?	Yes	Yes				No
Endosulphan	Yes	Yes	Yes				No
Esfenvalerate	?	Yes	Yes				
Fenoxycarb	?	Yes	Yes				
Fenpropathrin	Yes	Yes	Yes				
Furadan	?	Yes	Yes				No
Hydramethylnon	?	Yes	Yes				
Imidacloprid	Yes	Yes	Yes	Yes	Nearly	None	Yes
Kinoprene	?	Yes	Yes				
Malathion	?	Yes	Yes				
Methiocarb	Yes	Yes	Yes				No
Methomyl	Yes	Yes	Yes				No
Methyl bromide	?	Yes	Yes			<b>Fumigant only</b>	
Naled	?	Yes	Yes				No
Neem extract	<b>No</b>	Yes	Yes				
Nicotine	?	Yes	Yes				
Oxamyl	?	Yes	Yes				No
Oxydemeton methyl	?	Yes	Yes				No
Permethrin	Yes	Yes	Yes				
Petroleum distillates	<b>No</b>	Yes	Yes				
Phenothrin	?	Yes	Yes				
Phosmet	Yes	Yes	Yes				No
Potash soap	?	Yes	Yes				
Pymetrozine	<b>No</b>	Yes	Yes				

Active ingredient	Effective against GWSS <sup>1</sup>	Registered in CA	Registered for use in residential settings	Residual activity equal to or greater than carbaryl	Use pattern as broad as carbaryl	Use conditions that might limit effectiveness <sup>2</sup>	Less toxic and causes less possible harm to public health and environment than carbaryl <sup>3</sup>
Pyrethrin	?	Yes	Yes			Little residual activity	
Pyrethrin and PBO	?	Yes	Yes			Little residual activity	
Pyriproxyfen	<b>No</b>	Yes	Yes				
Resmethrin	?	Yes	Yes				
Tau-fluvalinate	?	Yes	Yes				
Tebufenozide	?	Yes	Yes				
Tetramethrin	?	Yes	Yes				
Thiamethoxam	Yes	Yes	Yes				
Tralomethrin	?	Yes	Yes				
Triforine	?	Yes	Yes				

<sup>1</sup>California Citrus Industry Guide to Glassy-winged Sharpshooter and Related Bacterial Diseases April 2001. Published by the Citrus Research Board. Unpublished data from Dr. Redak, UCR and Dr. Akey USDA. Mode of action from pesticide labels.

<sup>2</sup> includes: burning of treated plants if applied when temperatures exceed those listed on label, may not be applied to food crops, must be applied only by licensed applicators, used as a fumigant, must be ingested by chewing, etc.

<sup>3</sup> based on comparison of toxicity to test organisms - data from Farm Chemicals Handbook

Table 2. Materials Removed from Consideration for Use in the Urban/Residential Setting

Material	Reason for Removal from Consideration	Step at Which Material Eliminated in Figure 1
Acephate	low efficacy against GWSS <sup>1</sup>	1
Acetamiprid	not yet registered in California <sup>1</sup>	3
Aldicarb	highly toxic to mammals <sup>2</sup>	4
Aluminum phosphide	used only as a fumigant, inappropriate for GWSS program <sup>2</sup>	8
Avermectin	not effective against GWSS <sup>1</sup>	1
Azinphos-methyl	highly toxic to mammals <sup>2</sup>	4
<i>Bacillus thuringiensis</i>	effective against caterpillars (Lepidoptera) with chewing mouthparts; GWSS has sucking mouthparts and is not in the order Lepidoptera <sup>2</sup>	1
Chlorpyrifos	is not less toxic and does not cause less possible harm to public health and environment than carbaryl <sup>3</sup>	4
Cryolite	effective against insects with chewing mouthparts; GWSS has sucking mouthparts <sup>2</sup>	1
Furadan	is not less toxic and does not cause less possible harm to public health and environment than carbaryl <sup>3</sup>	4
Diazinon	potentially more toxic than carbaryl to wildlife <sup>2</sup>	4
Dimethoate	is not less toxic and does not cause less possible harm to public health and environment than carbaryl <sup>3</sup>	4
Disulfoton	is not less toxic and does not cause less possible harm to public health and environment than carbaryl <sup>3</sup>	4
Endosulphan	is not less toxic and does not cause less possible harm to public health and environment than carbaryl <sup>3</sup>	4
Hydramethylnon	used only in baits that must be chewed to have insecticide ingested; GWSS has sucking mouthparts <sup>2</sup>	8
Methiocarb	is not less toxic and does not cause less possible harm to public health and environment than carbaryl <sup>3</sup>	4
Methomyl	is not less toxic and have less possible harm to public health and environment <sup>2</sup> than carbaryl <sup>3</sup>	4
Methyl bromide	used only as a fumigant, inappropriate for GWSS program <sup>2</sup>	8
Naled	is not less toxic and does not cause less possible harm to public health and environment than carbaryl <sup>3</sup>	4
Neem extracts	not found to be effective against GWSS in field tests <sup>1</sup>	1
Oxamyl	is not less toxic and does not cause less possible harm to public health and environment than carbaryl <sup>3</sup>	4
Oxydemeton	is not less toxic and does not cause less possible	4

methyl	harm to public health and environment than carbaryl <sup>3</sup>	
Petroleum distillates	not effective against GWSS <sup>1</sup>	1
Phosmet	is not less toxic and does not cause less possible harm to public health and environment than carbaryl <sup>3</sup>	4
Pyrethrozin	not effective against GWSS <sup>1</sup>	1
Pyriproxyfen	not effective against GWSS <sup>1</sup>	1

<sup>1</sup>As more data on the effectiveness of various materials against GWSS becomes available, the CDFA will review further the use limitations and human and environmental toxicology of those that are effective against GWSS for potential incorporation into the program

<sup>2</sup>Data from Farm Chemicals Handbook, based on comparison of toxicity to test organisms- data from Farm Chemicals Handbook

<sup>3</sup>See previous table. Material has a toxicity profile similar to that of carbaryl, so therefore NOT less toxic and does not cause less possible harm to public health and environment than carbaryl.

Table 3. Materials That Are Still Being Considered For Use in Urban/Residential Settings

Active ingredient	Effective against GWSS <sup>1</sup>	Registered in CA	Registered for use in residential settings	Residual activity equal to or greater than carbaryl	Use pattern as broad as carbaryl	Use conditions that might limit effectiveness <sup>2</sup>	Less toxic and causes less possible harm to public health and environment than carbaryl <sup>3</sup>
Carbaryl	Yes	Yes	Yes	-----	-----	Can cause phytotoxicity if applied when air temperatures are too high	-----
Allethrin	?	Yes	Yes				
<i>Beauveria bassiana</i>	unlikely	Yes	Yes			Sensitive to low relative humidity	
Bifenthrin	Yes	Yes	Yes				
Cinnamaldehyde	?	Yes	Yes				
Cyfluthrin	Yes	Yes	Yes				
Lamda cyhalothren	?	Yes	Yes				
Cypermethrin	?	Yes	Yes				
Cyromazine	?	Yes	Yes				
Deltamethrin	Yes	Yes	Yes				
Diatomaceous earth	?	Yes	Yes				
Dimilin	?	Yes	Yes				
Esfenvalerate	?	Yes	Yes				

<b>Active ingredient</b>	<b>Effective against GWSS<sup>1</sup></b>	<b>Registered in CA</b>	<b>Registered for use in residential settings</b>	<b>Residual activity equal to or greater than carbaryl</b>	<b>Use pattern as broad as carbaryl</b>	<b>Use conditions that might limit effectiveness<sup>2</sup></b>	<b>Less toxic and causes less possible harm to public health and environment than carbaryl<sup>3</sup></b>
Fenoxycarb	?	Yes	Yes				
Fenpropathrin	Yes	Yes	Yes				
Imidacloprid	Yes	Yes	Yes	Yes	Nearly	No	Yes
Kinoprene	?	Yes	Yes				
Malathion	?	Yes	Yes				
Permethrin	Yes	Yes	Yes				
Phenothrin	?	Yes	Yes				
Potash soap	?	Yes	Yes				
Pyrethrin	?	Yes	Yes			Little residual activity	
Pyrethrin and PBO	?	Yes	Yes			Little residual activity	
Resmethrin	?	Yes	Yes				
Tau-fluvalinate	?	Yes	Yes				
Tebufenozide	?	Yes	Yes				
Tetramethrin	?	Yes	Yes				
Thiamethoxam	Yes	Yes	Yes				
Tralomethrin	?	Yes	Yes				
Triforine	?	Yes	Yes				

See Table 1 for source of information.

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX R**

**DEPARTMENT OF PESTICIDE REGULATION ENVIRONMENTAL  
MONITORING OF GROUND APPLICATIONS OF INSECTICIDE(S) IN  
GLASSY-WINGED SHARPSHOOTER TREATMENT AREAS**

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**California Environmental Protection Agency  
Department of Pesticide Regulation  
Environmental Monitoring and Pest Management  
830 K Street  
Sacramento, California 95814-3510**

**ENVIRONMENTAL MONITORING OF GROUND APPLICATIONS OF INSECTICIDE(S)  
IN GLASSY-WINGED SHARPSHOOTER TREATMENT AREAS**

June 12, 2000

## **I. INTRODUCTION**

The California Department of Food and Agriculture (CDFA) proposes to use ground applications of carbaryl and maybe other insecticides to manage glassy-winged sharpshooter (GWSS) infestations in California. The glassy-winged sharpshooter (*Homalodisca coagulata*) is a serious new pest in Central California. It can feed on over 70 species of crop and ornamental plants. It poses a serious threat to the vineyards due to its ability to spread *Xylella fastidiosa*, the bacterium that causes incurable Pierce's disease in grapes. The sharpshooter can also vector diseases to almond, alfalfa, oleander and citrus (UC 1999).

The Environmental Hazards Assessment Program (EHAP) of the Department of Pesticide Regulation (DPR) will conduct monitoring of selected treatments to provide information on the concentrations of the chemical in various environmental media that may include surface, irrigation runoff, and storm runoff water, turf, soil and air. Additionally, representative backyard vegetables and fruits will be sampled. In the event that ecologically sensitive areas are present toxicity to aquatic organisms will also be determined in surface water. This proposed monitoring plan follows the general models in previous studies of carbaryl and other insecticides applied in gypsy moth eradication projects (Neher et al. 1982; Weaver et al. 1983) and in Japanese beetle eradication projects (Segawa 1988).

This proposed monitoring plan will be followed for each application event. More than one application event may be monitored; the total number of events to be monitored will be decided when the extent of the treatment program is known. The final matrices and total numbers of samples collected will be determined once this information is available. The monitoring data will be used by CDFA to assess proper application rate and coverage and to estimate public exposure to the application.

## **II. OBJECTIVE**

The objectives of this study are to:

- 1) Measure the amount of carbaryl (or other GWSS insecticides) in air, selective backyard vegetable and fruit, surface, irrigation runoff and storm runoff waters. Turf or soil may also be monitored.

2) Measure dissipation half-life of carbaryl in soil and turf, if turf or soil is sprayed.

### III. PERSONNEL

This study will be conducted by EHAP under the general direction of Kean S. Goh, Agriculture Program Supervisor IV. Key personnel include:

Project Leader: Roger Sava

Field Coordinator: Nina Bacey and Johanna Walters

Statistician: Terri Barry

Laboratory Liaison: Carissa Ganapathy

Analyzing Laboratory: California Department of Food and Agriculture, Center for Analytical Chemistry

Agency and Public Contact: Kean S. Goh at (916) 324-4072, [kgoh@cdpr.ca.gov](mailto:kgoh@cdpr.ca.gov)

### IV. STUDY DESIGN

The current GWSS infestations in Northern California are mainly in the Tulare and Fresno County. Proposed application sites cover nine square miles including residential areas. Multiple applications of 2-3 sprays at 7-14 day interval have been proposed. The following sampling plan represents one application event. Some matrices may be sampled at the end of the multiple treatments to provide data on worst-case scenario. Surface water sampling may occur outside treatment areas if they receive runoff water from within the treatment area. Vegetation and air monitoring will occur at the application sites.

Tank Samples will be taken at the ten sites selected for monitoring of environmental matrices. This is to ensure that correct rate of chemical has been applied.

A leafy vegetable and a fruit will be sampled at 10 sites after the elapsed of designated preharvest interval for each crop. Samples will be analyzed for total residues. Prespray samples will be taken.

Turf and/or surface soil. In the event that turf or soil are treated or heavily impacted from the sprays than samples will be collected from 10 application sites. Collection will occur after spray has dried to determine the maximum concentrations in treated areas. Turf samples will be analyzed for dislodgeable residue only. At five of the 10 sites, samples will be collected for up to eight additional sampling dates to determine dissipation rates of insecticide in turf and soil. Dissipation sampling for turf and/or soil may be performed offsite in a controlled setting due to complications with mowing, cultivating and irrigation practices. Half-lives will be estimated using standard statistical methods.

Air samples will be collected. Samples will be collected at five sites in the highest use area to measure ambient insecticide concentrations. The samples will be collected for a 24-hour period before application (background). From the start of application a 24-hour sample will be taken at

each of the five sites follow by another 24-post-application sampling. Sampling will be time for peak application period.

Surface waterways containing residential and agricultural irrigation runoff will be monitored, both prior to and following applications to determine insecticide concentrations. Additionally, accessible storm runoff sites will be monitored during rain runoff events to determine concentrations due to wash off from exposed surfaces. During the first rain event after the initial application, samples will be collected at points of discharge and/or at areas of concern for aquatic organisms. The number and frequency of samples collected will depend on availability and sensitivity of water bodies and on the intensity and duration of the runoff event.

Aquatic toxicity. If the application areas have ecologically sensitive site, surface water samples will be tested for aquatic toxicity. DFG will assist in the selection of aquatic species for toxicity testing. The species selected will depend upon the origin of the water samples. Toxicity testing will use U. S. Environmental Protection Agency (1993) and American Society for Testing of Materials (1992) methods. Water quality parameters (alkalinity, hardness, electrical conductivity, ammonia, pH, dissolved oxygen, and water temperature) will also be measured.

## V. SAMPLING METHODS

Tank Sample. Distinct well-mixed tank sample will be taken from each of the ten sites. Sample in 1-L amber bottle will be kept on wet ice until analysis.

10 sites x 1 sample/site=10 samples

Fruit & Vegetable. A leafy vegetable and a fruit will be sampled after their respective preharvest interval has elapsed. Two one-pound sample of each will be taken from 10 sites and placed in paper bag and stored on dry ice until extraction.

10 sites x 2 samples x 2 plant parts = 40 samples

Turf. In the event that turf is sprayed, a single turf-thatch sample composited from turf-thatch plugs collected from at least four randomly selected subsites within an application site will be taken. Two turf samples will be collected at each application site. Samples will be collected using a rubber mallet to drive a 6.3-cm i.d., stainless steel cylinder approximately 10 cm into the soil/turf. The cylinder containing the soil/turf plug is removed from the earth, and then the core is removed (pushed) from the cylinder. The turf-thatch will be cut off and placed in wide-mouth, glass jars, and sealed with an aluminum foil lined lid. The number of turf-thatch cores collected and the corresponding turf-thatch weight will be recorded on each sample's COC. In the field, samples will be stored on dry ice or refrigerated at -20°C until extraction.

10 sites x 2 samples/site = 20 residue samples  
5 sites x 8 periods =40 dissipation samples

Soil. In the event that soil is sprayed or heavily impacted, four soil cores will be collected at four randomly selected subsites within an application site. Two soil samples will be collected at each application site. Soil cores will be collected by inserting a 6.3-cm internal diameter (i.d.), stainless steel cylinder into the soil to a depth of 2.5 cm. The soil cores will be placed into a glass jar and sealed with an aluminum foil lined lid. The number of soil cores collected and corresponding soil weight will be recorded on each sample's chain of custody (COC). In the field, samples will be stored on dry ice or refrigerated at -20°C until extraction.

$$\begin{aligned} 10 \text{ sites} \times 2 \text{ samples/site} &= 20 \text{ samples} \\ 5 \text{ sites} \times 8 \text{ periods} &= 40 \text{ dissipation samples} \end{aligned}$$

Air. Five sites, centrally located in the treatment area, will be sampled to measure outdoor ambient air concentrations of insecticide. These sites will be located within a circular area measuring one-half mile in diameter. Sites must also be accessible at all hours, protected from any direct spray, and have electrical power to run the samplers. Anderson model SE-114 sampling pumps, calibrated to 15 liters/min, mounted with XAD-4 resin tubes as the trapping medium will be used at each site. The samples will be collected for a 24-hour period before application (background), 24 hours starting at application, and 24 hours post-spray.

$$5 \text{ sites} \times 3 \text{ sample periods} \times 1 \text{ sample/site} = 20 \text{ samples}$$

Surface water. Surface water samples will be collected using a depth-integrated sampler (D-77) with a 3-liter Teflon® bottle and nozzle. Five to twenty vertical depth integrated samples will be composited at each site. At sites where the D-77 sampler cannot be used, due to insufficient water depth or access, a grab sample will be collected. Grab samples will be collected as close to center channel as possible using a 10-liter stainless steel bucket or a grab pole consisting of a glass bottle at the end of a 5-foot pole. Samples will be split into amber glass bottles using a Geotech® 10-port splitter then sealed with Teflon®-lined lids. Samples to be analyzed for pesticides will be preserved (if needed) by acidification with 3N hydrochloric acid to a pH between 3.0 to 3.5, and then samples will be stored on wet ice or refrigerated at 5°C until extraction. Toxicity samples will be delivered on wet ice to the CDFG Aquatic Toxicity Laboratory within 30 hours.

$$\text{Est. } 5 \text{ sites} \times 5 \text{ periods} \times 1 \text{ sample/site/period} = 25 \text{ samples}$$

## **VI. CHEMICAL ANALYSIS / TOXICITY TESTING**

Chemical analysis will be performed by the CDFA's Center for Analytical Chemistry. Analytical methods are being validated and quality control measures are described in Segawa (1995). In the event that toxicity testing is deemed necessary, DFG's Aquatic Toxicology Laboratory will perform aquatic toxicity tests on surface water samples and measure totals of alkalinity, hardness and ammonia.

## VII. DATA ANALYSIS

Concentrations for dislodgeable residues of insecticide in turf/thatch will be reported as milligrams per square meter ( $\text{mg}/\text{m}^2$ ) and parts per million (ppm) wet weight and dry weight; soil concentrations will be reported as ppm and  $\text{mg}/\text{m}^2$  on a wet weight and dry weight basis. Concentrations of total residues in fruit and leafy vegetable will be reported as  $\text{ug}/\text{g}$  or ppm wet weight basis. Concentrations of insecticide in air will be reported as both micrograms per cubic meter ( $\text{ug}/\text{m}^3$ ) and parts per trillion (ppt), and water concentrations will be reported as both micrograms per liter ( $\text{ug}/\text{L}$ ) and parts per billion (ppb). When sample size permits, means, percentiles and frequency histograms will be presented. Toxicity data will be presented as percent survival. Water concentrations will be compared with toxicity data to aid in the interpretation of toxicity test results.

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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX S**

**DEPARTMENT OF PESTICIDE REGULATION ENVIRONMENTAL  
MONITORING OF CARBARYL APPLIED IN URBAN AREAS TO CONTROL  
THE GLASSY-WINGED SHARPSHOOTER IN CALIFORNIA (SUMMARY 2000)**

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# **ENVIRONMENTAL MONITORING OF CARBARYL APPLIED IN URBAN AREAS TO CONTROL THE GLASSY-WINGED SHARPSHOOTER IN CALIFORNIA (SUMMARY 2000)**

Johanna Walters, Roger Sava, Pam Wofford, Nina Bacey, Dave Kim, and Kean S. Goh  
California Department of Pesticide Regulation, 1001 I Street, Sacramento, CA 95812 USA  
Hsiao Feng, Jorge Hernandez, and Jane White  
Center for Analytical Chemistry, 3292 Meadowview Rd., Sacramento, CA 95832 USA

## **1. INTRODUCTION**

The glassy winged sharpshooter *Homalododisca coagulata* is a serious insect pest introduced to California. It can feed on over 70 species of crop, ornamental and native plants and is a serious threat to California vineyards because it can transmit a bacterium, *Xyella fastidiosa*, that caused deadly Pierce's disease in grapes (UC 2000). This insect has been found newly infesting plants of urban areas in Butte, Contra Costa, Fresno, Sacramento, and Tulare Counties, some important grape growing regions in central California. To prevent the insect from moving into vineyards, the State of California has been spraying urban trees, shrubs, and garden fruits and vegetables with carbaryl (1-naphthyl N-methylcarbamate), a common home and garden carbamate insecticide. The public expressed concerns about human and environmental impacts regarding these treatments.

## **OBJECTIVE**

To monitor carbaryl in the spray mixtures, air, surface waters, plant foliage, fruits and vegetables in the sprayed areas.

## **2. MATERIALS AND METHODS**

### **2.1 INSECTICIDE APPLICATION**

A liquid carbaryl product ("7" Carbaryl Insecticide ®) formulated for homeowner use contained 41.2% of active ingredient was applied to trees, shrubs and herbaceous plants at the label rates ranging from 0.11% to 0.21% active ingredient.

In Porterville, Tulare County approximately 980 properties, residential and commercial, were sprayed over 2, 300 ha on June 19-21, 27, and July 18, 2000.

In Fresno and Clovis, Fresno County approximately 428 infested properties, residential and commercial, were sprayed over 37 acres starting late June, 2000.

In Rancho Cordova, Sacramento County approximately 478 residential properties were sprayed over approximately 9.7 acres the Country Club Mobile Home Park on August 2 and 16, 2000.

In Brentwood, Contra Costa County approximately 80 acres residential properties and curbsides were sprayed in the Garin Ranch community. Application began on October 23, 2000.

In Chico, Butte County approximately 190 acres of highway, businesses, park, curbside, and parking lots were sprayed. One application made over the course of one day; November 5, 2000. Caltrans, starting at approximately 1AM on November 5, 2000 made applications to Highway 99.

## **2.2 FIELD MONITORING**

### **TANK SAMPLING**

One tank sample was collected during the treatment at each air-sampling site. Samples were collected from the hose nozzle into a plastic 500-mL container. Samples were stored separated from other samples on wet ice until delivery to the lab for analysis (California Department of Food and Agriculture's Center for Analytical Chemistry, Sacramento, Calif. USA).

### **SURFACE WATER SAMPLING**

Pre- and Post-application surface water samples and rain runoff samples were collected where available. River and creek samples were collected as close to center channel using a 10-liter stainless steel bucket and divided into one-liter amber bottles and sealed with a Teflon®-lined lid. Pond waters were collected by filling a one-liter amber bottle directly from the pond and sealing with a Teflon®-lined lid. Water treatment basin and swimming pool samples were collected by submerging a one-liter amber bottle directly from the sites. All samples were acidified to a pH of 3.0 to 3.5, then sealing with a Teflon®-lined lid. All surface water samples were stored on wet ice during transport or in a 4°C refrigerator at the storage facility until transported to the laboratory. Quality control samples consisted of field blanks collected at the time of sampling to ensure no contamination occurred.

### **FOLIAGE SAMPLING**

Leaf samples were collected at all sites monitored for air using a leaf puncher. Each sample consisted of 40 2.54-cm diameter leaf punches collected into a 30-mL glass jar and sealed with a Teflon®-lined lid. Two samples were collected from each site: one before application (background) and the other after spray had dried (generally one hour after the application ended). Leaf punches were collected from several plants within each site with the before-and after-application samples at each site collected from the same plants. Samples were collected from a height range of 0.3 to 1.8 m from the ground, stored on wet ice and delivered within 36 h for the analyses of dislodgeable foliar residue.

### **PRODUCE SAMPLING**

Produce samples were obtained where any backyard fruits and vegetables were available and ripe, from treated properties. Each sample consisted of approximately 0.5 kg of produce collected into either a quart glass Mason jar with an aluminum foil lined lid or wrapped in aluminum foil and placed in plastic polyethylene bags. Samples were collected at the preharvest interval, the required minimum number of days between last application and harvest. The preharvest intervals were three days for apricot, nectarine, peach, plum, squash, and tomato; five days for citrus; and seven days for grapes. Samples were stored on dry ice during transport or in a freezer at the storage facility until delivered to the laboratory for analysis.

### 3. RESULTS AND DISCUSSIONS

#### 3.1 TANK SAMPLES

According to product label-directions, the nominal mixing rate ranged from 0.11% to 0.21% active ingredient of carbaryl depending on the plant type. The 0.11% was the most appropriate rate to be applied to vegetables, fruit trees and ornamental shrubs for glassy-winged sharpshooter control found in concentrations and exceeded the nominal label rate. The applicators in Fresno, Sacramento, Contra Costa, and Butte Counties consistently used label rate (Table I).

**TABLE I. CONCENTRATIONS OF CARBARYL (% ACTIVE INGREDIENT) IN TANK SAMPLES CALIFORNIA, 2000**

County	Location	Date Sampled	Conc. (% AI)
Tulare	Capitola St.	6/20/00	0.26
"	W. Grand Ave.	6/20/00	0.31
"	Morton Ave.	6/21/00	0.25
"	Bel Air Cir.	6/27/00	0.32
"	Mulberry Ave.	7/18/00	0.21
Fresno	E. Geary Street	6/27/00	0.15
"	W. Birch Ave.	7/12/00	0.13
"	W. Minarets Ave.	7/12/00	0.13
"	E. Atchison Ave.	7/25/00	0.11
"	Barstow Ave.	8/8/00	0.1
"	W. Minarets Ave.	8/22/00	0.126
Sacramento	Royal Crest Cir.	8/2/00	0.11
"	Wilderness Rd.	8/2/00	0.12
"	Royal Crest Cir.	8/16/00	0.125
Contra Costa	Boltzen Street	10/23/00	0.123
Butte	Chico Mall	11/4/00	0.15
"	Whitman Avenue	11/4/00	0.14

#### 3.2 AIR MONITORING

The carbaryl residues were mostly from spray particles at the properties sampled or drifted from adjacent properties. There is currently no health level established for acute inhalation exposure to carbaryl. The DPR established a 51.7 ug/m<sup>3</sup> as an interim health screening level (Sanborn 2000). The highest concentration detected was at least 50 fold lower than the health level; hence, there were no significant or health impacts associated with the application (Table II).

**TABLE II. CONCENTRATION OF CARBARYL IN AIR IN TREATED URBAN AREAS,  
CALIFORNIA, 2000.**

County	Location	Treatment Date	Background	Concentration (µg/m <sup>3</sup> )		
				Interval I	Interval II	Interval III
Tulare						
	W. Morton Ave. a	None	ND	NS	NS	NS
“	Capitola St. a	6/20/00	ND	0.17	0.17	0.16
“	W. Grand Ave.a	6/20/00	ND	0.19	0.2	0.17
“	W. Morton Ave. a	6/20/00	0.003	1.12	0.46	0.42
“	Bell Aire Cir.a	6/27/00	0.06	1.12	0.38	0.32
“	Mulberry Ave.b	7/18/00	ND	ND	0.34	0.34
Fresno						
	E. Geary St. a	6/27/00	ND	0.43	0.44	0.3
“	W. Minarets Ave.b	7/12/00	ND	ND	0.07	ND
“	W. Birch Ave.b	7/12/00	ND	ND	ND	ND
“	E. Atchison Ave. b	7/25/00	ND	ND	0.2	0.08
“	Barstow Ave.b	8/8/00	NS	ND	0.08	0.04
“	W. Minarets Ave.b	8/22/00	NS	1.9	0.33	0.13
Sacramento						
“	Royal Crest Cir.b	8/2/00	ND	0.93	0.64	0.31
“	Wilderness Rd.b	8/2/00	NS	0.54	0.32	0.18
“	Royal Crest Cir.b	8/16/00	NS	0.83	0.84	0.53
Contra Costa						
	Boltzen	10/23/00	ND	ND	0.10	0.13
Butte	Whitman	11/04/00	ND	ND	ND	ND

- a. Samples collected with a high volume air sampler calibrated at approximately 1000 L/min., reporting limit=0.007µg/m<sup>3</sup>; ND=none detected; NS=not sampled
- b. Samples collected with SKC personal sir sampler calibrated at approximately 3L/min., reporting time=0.05 µg/m<sup>3</sup>

### 3.3 SURFACE WATER MONITORING

Carbaryl was detected at a drinking water treatment basin and a home fishpond in Sacramento County (Table III). The 0.125 ppb detected was well below the drinking water health action level of 60 ppb established by the California Department of Health Services (CDHS 2000). The carbaryl in the home fishpond (6.94 ppb) was the result of the resident hosing down the treated area resulting in water running into the ground-level fishpond. In Tulare County, the death of three goldfish at an untreated home had no detection of carbaryl in the fish tissue and the pond water. The LC50 for goldfish was 13.2 ppm (Kidd and James, 1987); therefore, it is highly unlikely that the fish kill was due to carbaryl.

**TABLE III. CARBARYL CONCENTRATION IN SURFACE WATER AND FISH IN TREATED URBAN AREAS, CALIFORNIA, 2000**

<b>County</b>	<b>Location</b>	<b>Date Sampled</b>	<b>Conc. (ppb)</b>
Tulare			
	Tule River	6/20/00	ND
	Cobb St. fishpond	7/18/00	ND
	Tule River	7/18/00	ND
	W. Mulberry Ave.; fishpond	7/19/00	ND
	W. Mulberry Ave.; goldfish	7/19/00	ND
Sacramento			
	Canal	8/1/00	ND
	Water Treatment Basin 1	8/1/00	ND
	Water Treatment Basin 2	8/1/00	0.125
	Community Pool	8/2/00	ND
	Water Treatment Basin 1 & 2	8/3/00	ND
	Canal	8/16/00	ND
	Water Treatment Basin 1 & 2	8/16/00	ND
	Community Pool	8/17/00	ND
	Gumtree Dr.; fishpond	8/17/00	6.94
Contra Costa			
	Bartlett Ct. rain runoff	10/23/00	1700
Butte			
	Little Chico Creek, rain runoff	11/13/00	ND
	Comanche Creek, rain runoff	11/13/00	ND

Surface water reporting limit =0.05 ppm; ND =none detected. Fish tissue reporting limit =0.1 ppm

### **3.4 DISLODGEABLE FOLIAR RESIDUES**

The higher foliar concentrations detected in Tulare County reflected the higher rate used as shown in the tank mix samples (Table IV). In general the foliar coverages were relatively uniform. These concentrations were comparable to reported safe reentry level of 2.4 to 5.6 ug/m<sup>3</sup> for citrus (Iwata et al. 1979).

**TABLE IV. DISLUDGEABLE FOLIAR RESIDUE OF CARBARYL FOR DIFFERENT PLANTS IN TREATED URBAN AREAS, CALIFORNIA, 2000**

County	Location	Date	Leaf Type	Concentration (µg/cm <sup>2</sup> )	
				Background	Post Application
Tulare					
“	Capitola Street	6/20/00	apricot, citrus, and grape	ND	5.3
“	Morton Ave	6/20/00	oleander, wax privet	ND	6.78
“	W. Grand	6/20/00	oleander, wax privet	ND	5.44
“	Bel Air Cir.	6/27/00	wax privet	ND	5.41
“	Mulberry	7/18/00	rose leaves	0.87	5.7
Fresno					
“	E Geary St	6/27/00	plum, citrus, oleander	ND	4.76
“	W. Birch	7/12/00	liquid ambar and rose	ND	2.97
“	W. Minarets	7/12/00	grape, crepe myrtle	0.11	2.97
“	E. Atchison	7/24/00	grape leaves	0.06	3.09
“	Barstow Ave.	8/8/00	wax privet	NS	7.12
“	W. Minarets	8/22/00	grape leaves	NS	5.16
Sacramento					
“	Royal Crest Cir.	8/1/00	oleander	ND	2.9
“	Wilderness Dr.	8/2/00	plum	ND	2.28
“	Royal Crest Cir.	8/16/00	oleander	ND	3.79
Contra Costa					
	Boltzen St	10/23/00	sycamore, wax privet	ND	1.54
Butte					
	Community Park	11/5/00	crepe myrtle	ND	2.14
	Chico Mall	11/5/00	oleander	ND	3.79

Reporting limit=0.0012 µg/cm<sup>2</sup>; ND=none detected, NS=not sampled

### 3.5 PRODUCE SAMPLES

All concentrations of carbaryl were below the tolerances for carbaryl of 10ppm for all commodities sampled (Table V).

**TABLE V. CARBARYL CONCENTRATION IN TREATED BACKYARD PRODUCE HARVESTED AT THE ELAPSE OF PREHARVEST INTERVALS, IN URBAN AREAS, CALIFORNIA, 2000**

County	Location	Date Sampled	Produce Type	Concentration (ppm)
Tulare				
"	Capitola St.	6/23/00	apricots	1.53
"	Capitola St.	6/23/00	tomato	4.27
"	W. Olive Ave.	6/26/00	navel orange	1.59
"	W. Olive Ave.	6/26/00	Valencia orange	2.09
"	Sandra Lane	6/27/00	zucchini	0.945
"	Sandra Lane	6/27/00	summer squash	0.33
"	Sandra Lane	6/27/00	nectarine	7.56
"	Gerry St.	6/28/00	grapefruit	ND
"	W. Olive Ave.	6/28/00	grapes	0.161
"	Westfield Ave.	6/29/00	grapefruit	0.649
Fresno				
"	E. Geary St.	6/30/00	plum	0.197
"	E. Geary St.	6/30/00	peach	0.152
"	E. Geary St.	7/2/00	lemon	ND
"	W. Minarets Ave.	7/19/00	grapes	ND
"	E. Atchison Ave.	7/28/00	plum	0.124
"	E. Atchison Ave.	7/28/00	tomato	ND
"	E. Atchison Ave.	7/28/00	peach	ND
"	E. Atchison Ave.	8/1/00	grapes	1.65
Sacramento				
"	Royal Crest Cir.	8/5/00	tomato	4.03
"	Wilderness Dr.	8/5/00	plum	0.251
"	Royal Crest Cir.	8/19/00	tomato	7.26

Reporting time=0.05 ppm

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## **Disclaimer:**

The mention of commercial products, their source, or use in connection with material reported herein is not to be construed as either an actual or implied endorsement of such product.

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UC 2000: Report of the University of California Pierce's Disease Research and Emergency Response Task Force. University of California, Office of the President.



## PDCP Treatment Monitoring Results

The following monitoring reports are available from CDPR's website,  
<http://www.cdpr.ca.gov/docs/gwss/reports.htm>

- Walters, J., H. Casjens, and K. Goh. 2001. *Preliminary Monitoring Results of Imidacloprid and Cyfluthrin Applications for Glassy-Winged Sharpshooter Control in Commercial Areas of Butte County.*
- Walters, J., P. Wofford, H. Casjens, and K. Goh. 2001. *Preliminary Monitoring Results of Carbaryl Applications for Glassy-Winged Sharpshooter Control in Residential Areas of Santa Clara County.*
- Walters, J. and K. Goh. 2001. *Preliminary Monitoring Results of Imidacloprid Applications for Glassy-Winged Sharpshooter Control in Residential Areas of Sacramento County.*
- Walters, J. and K. Goh. 2000. *Preliminary Monitoring Results of Carbaryl Applications for Glassy-Winged Sharpshooter Control in Residential Areas of Butte County.*
- Goh, K. and J. Walters. 2000. *Preliminary Monitoring Results of Carbaryl Applications for Glassy-Winged Sharpshooter Control in Residential Areas of Contra Costa County.*
- Walters, J., R. Sava, N. Bacey, and K. Goh. 2000. *Preliminary Monitoring Results of Carbaryl Applications for Glassy-Winged Sharpshooter Control in Residential Areas of Sacramento County.*
- Walters, J., R. Sava, N. Bacey, and K. Goh. 2000. *Preliminary Monitoring Results of Carbaryl Applications for Glassy-Winged Sharpshooter Management in Residential Areas of Fresno County.*
- Walters, J., R. Sava, N. Bacey, and K. Goh. 2000. *Preliminary Monitoring Results of Carbaryl Applications for Glassy-Winged Sharpshooter Control in Residential Areas of Tulare County.*



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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX T**

**PIERCE'S DISEASE CONTROL PROGRAM RESEARCH PROJECTS**

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**PIERCE'S DISEASE CONTROL PROGRAM - RESEARCH PROJECTS**

<b>Principal Investigators</b>	<b>Title</b>
Carole Meredith	A genetic map of <i>Vitis vinifera</i> . A foundation for improving the management of disease and flavor
Carole Meredith	Genetic transformation: A means to add disease resistance to existing grape varieties
Donald Cooksey	Biological control of Pierce's disease with non-pathogenic strains of <i>Xylella fastidiosa</i>
Donald Cooksey, Heather Costa	Epidemiology of Pierce's disease in Southern California: Identifying inoculum sources and transmission pathways
Mark Hoddle, Sergui Triapitsyn, Robert Luck, Rick Redak	Biological control of GWSS in California: one cornerstone for the foundation of an IPM program
Rick Redak	Impact of layering control tactics on the spread of Pierce's disease by the GWSS
Rick Redak	Developing an integrated pest management solution for Pierce's disease spread by the glassy-winged sharpshooters in Temecula
Rick Redak	Basic Information on the spread of PD by the GWSS, and investigate plant protection tactics.
Rick Redak	Controlling the spread of <i>Xylella fastidiosa</i> the causal agent of oleander leaf scorch by disrupting vector acquisition and transmission
Robert Luck, Mark Hoddle, Rick Redak	Seasonal changes in the GWSS age structure, abundance, host plant use, and dispersal
Jeffrey Granett, M. Andrew Walker, Amir Omer	Prevention of Pierce's disease transmission and infection: role of induced plant resistance
Bruce Kirkpatrick, Alexander Purcell, Peter Anderson (UF), M. Andrew Walker, Edward Weber	Biological, cultural, and chemical management of Pierce's disease
Alexander Purcell	Pruning for control of Pierce's disease
Russ Mizell (UF)	Key to management of glassy-winged sharpshooter: manipulation of host plants to explore nutrient limitations and natural enemies
John Peloquin, Thomas Miller, Carol Lauzon (CSU Hayward)	Insect-symbiotic bacteria inhibitory to Xf in sharpshooters
Jerome Siebert	Economic impact data gathering for Pierce's disease
Ron Brlansky (UF)	Transmission of the citrus variegated chlorosis bacterium, <i>Xylella fastidiosa</i> , with the glassy-winged sharpshooter, <i>Homalodisca coagulata</i>
Phil Phillips	Surveys for more effective glassy-winged sharpshooter parasitoids
Beth Grafton-Cardwell	Efficacy of insecticides used for glassy-winged sharpshooter control in citrus
Beth Grafton-Cardwell	Evaluation of efficacy of Sevin (carbaryl) treatments in the Porterville glassy-winged sharpshooter infestation
Nick Toscano	Monitoring of the GWSS
Donald Luvisi	GWSS/PD Research
Tad Poprawski	Test novel biorational insecticides on GWSS
Dr. Walker	Classical biocontrol of GWSS
Gary Puterka	Repellents and biorationals for control of GWSS

Principal Investigators	Title
T. J. Henneberry	Potential biorationals for GWSS control
Nick Toscano	Area-wide abatement of GWSS
Ed Civerolo	Genomic work on PD strains
Ed Civerolo	Epidemiology of <i>Xylella fastidiosa</i> in California: relationship between PD and almond scorch, and the relationship of stone fruits and citrus to the epidemiology of these diseases
Miller et al	Insect –symbiotic bacteria inhibitory to <i>Xylella fastidiosa</i> in sharpshooters
Hammock/Kamita	Isolation and characterization of GWSS pathogenic viruses
Toscano/Castle	Laboratory and field evaluations of Imidacloprid, thiamethoxam and Acetamiprid against GWSS on citrus, grapes, and almonds
Walker/Ramming	Additional funding for an expanded genetic control of PD program
Costa/Cooksey	Incidence of <i>Xylella fastidiosa</i> in GWSS populations and the impact of multiple-strain on acquisition and transmission
Adams	Identification of the molecular markers in the grapevines response to infection by <i>Xylella fastidiosa</i>
Cooksey	Control of PD through degradation of Xanthan gum
Luck/Hodde	Spatial and temporal relations between GWSS survival and movement, xylem flux patterns and xylem chemistry in different host plants
Leal/Zalom	Developing a novel detection and monitoring system for GWSS
Leopold/Yocum	Cold storage of parasitized and unparasitized eggs of GWSS
Peng/Zalom	Reproductive biology and physiology of GWSS
Cohen	Development of an artificial diet for GWSS
Lauzon	A survey of insect vectors of PD and PD infected plants for the presence of bacteriophage that infect <i>Xylella fastidiosa</i>
Labavitch/Matthews	The development of PD in xylem: role of vessel cavitation, cell wall metabolism and vessel occlusion
Price	<i>Xylella fastidiosa</i> bacterial polysaccharides with a potential role in PC
Stewart	Regulation of <i>Xylella fastidiosa</i> exopolysaccharide gene expression
Hunt	Mating behavior of GWSS
Kirkpatrick	Production and screening of <i>Xylella fastidiosa</i> transposon mutants and microscopic examination of Xf resistant and susceptible germplasm
Gilchrist/Lincoln	Application of Agrobacterium rhizogenes-mediated transformation strategies for a) rapid high through put screen for genetic resistance to PD in grape that maintains clonal integrity of the recipient host and b) rapid screening for virulence determinants in <i>Xylella fastidiosa</i>
Cook	Functional genomics of the grape- <i>Xylella</i> interaction: towards identification of host resistance determinants
Jeffrey Granett, M. Andrew Walker, Amir Omer	Prevention of Pierce's disease transmission and infection: role of induced plant resistance
FAPESP	Sequence of <i>Xylella fastidiosa</i> Strain Causing PD of California Grapevine
Peloquin	Sharpshooter-associated bacteria that may inhibit PD

Principal Investigators	Title
Brazilian – FAPESP	<i>Xylella fastidiosa</i> genome analysis – almond and oleander comparison to PD Temecula 1 and citrus strains.
Hix	Development of Trapping Systems to trap the GWSS <i>homalodisca coagulata</i> adults and nymphs in grape
Kirkpatrick	Studies on Bacterial Canker and Almond Leaf Scorch - *
Lindow	Management of PD of grape by interfering with cell-cell communication in <i>Xylella fastidiosa</i>
Mizell	Host selection behavior and improved detection for GWSS, <i>Homalodisca coagulata</i> (Say)
Price	Bacterial polysaccharides expressed by infective <i>Xylella fastidiosa</i> during PD
Purcell	Transmission of <i>Xylella fastidiosa</i> to almonds by the GWSS

Source: CDFA, Includes research projects funded as of March, 2001.

FAPESP – Fundacao De Amparo A Pesquisa Do Estado De Sao Paulo (The State of Sao Paulo Research Foundation, Brazil)



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**PIERCE'S DISEASE CONTROL PROGRAM EIR**

**APPENDIX U**

**SUMMARY OF PESTICIDE APPLICATIONS IN URBAN AREAS UNDER THE  
EMERGENCY PIERCE'S DISEASE CONTROL PROGRAM IN 2000 AND 2001**

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## SUMMARY OF PESTICIDE APPLICATIONS IN URBAN AREAS UNDER THE EMERGENCY PIERCE'S DISEASE CONTROL PROGRAM IN 2000 AND 2001

### SUMMARY OF PESTICIDE APPLICATIONS FOR GLASSY-WINGED SHARPSHOOTERS IN YEAR 2000

Product	Butte County	Contra Costa County	Fresno County	Sacramento County	Santa Clara County	Tulare County	Total
<b>Carbaryl (Sevin)</b>	5.0 gal.	7.95 gal.	120.1 gal.	18.14 gal.	--	262.5 gal.	413.69 gal.
Amount of active ingredient:	18.9 lbs.	31.8 lbs.	395.86 lbs.	68.48 lbs.	--	991.7 lbs.	1506.74 lbs.
<b>Imidacloprid (Merit)</b>	--	13.2 lbs.	367.75 lbs.	3.84 lbs.	--	--	384.79 lbs.
Amount of active ingredient:	--	9.9 lbs.	275.8 lbs.	2.88 lbs.	--	--	288.58 lbs.
<b>Cyfluthrin (Tempo)</b>	--	--	--	136.55 lbs.	--	--	136.55 lbs.
Amount of active ingredient:	--	--	--	27.31 lbs.	--	--	27.31 lbs.
<b>TOTAL ACREAGE TREATED BY COUNTY (ESTIMATED)</b>							
	20	13.76	637.4	26	--	258	955.06 acres

*Source: CDFA (Stacie Oswalt, email correspondence March 15, 2001)*

### SUMMARY OF PESTICIDE APPLICATIONS FOR GLASSY-WINGED SHARPSHOOTERS IN YEAR 2001 (AS OF AUGUST 28, 2001)

Product	Butte County	Contra Costa County	Fresno County	Sacramento County	Santa Clara County <sup>a</sup>	Tulare County	Total
<b>Carbaryl (Sevin)</b>	6.8 gal.	--	--	--	7.3 gal.	64.5 gal.	78.6 gal.
Amount of active ingredient:	25.67 lbs.	--	--	--	27.58 lbs.	243.2 lbs.	296.45 lbs.
<b>Imidacloprid (Merit)</b>	0.93 lbs.	0.38 lbs.	199.0 lbs.	2.0 lbs.	6.90 lbs.	--	209.21 lbs.
Amount of active ingredient:	0.69 lbs.	0.28 lbs.	149.25 lbs.	1.5 lbs.	5.18 lbs.	--	156.9 lbs.
<b>Cyfluthrin (Tempo)</b>	0.321 gal. <sup>b</sup>	--	--	0.46 lbs. <sup>c</sup>	--	--	0.46 lbs. + 0.321 gal.
Amount of active ingredient:	0.38 gal.	--	--	0.092 lbs.	--	--	0.092 lbs. + 0.38 gal.
<b>TOTAL ACREAGE TREATED BY COUNTY (ESTIMATED)</b>							
	49.4	1.16	125	2.1	16	86.43	280.09 acres

<sup>a</sup> Santa Clara County totals as of August 30, 2001.

<sup>b</sup> Tempo Ultra (fluid)

<sup>c</sup> Tempo 20 (powder)

*Source: CDFA (Stacie Oswalt, email correspondence September 7, 2001)*

